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THE SCOTS FARMER:

OR

SELECT ESSAYS ON AGRICULTURE;

ADAPTED

To the SOIL and CLIMATE

OF

SCOTLAND.

VOLUME I.

——— Laudato ingentia rura;
Exiguum colito. VIRGIL.

Venio nunc ad voluptates agricolarum, quibus ego incredibiliter delector; quae nec ulla impediuntur senectute, et mihi ad sapientis vitam proxime videntur accedere. CICERO.

EDINBURGH:
Printed and sold by WILLIAM AULD, Turk's Close,
M,DCC,LXXIII.



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INTRODUCTION

THE SCOTS FARMER,

NUMBER I.

INTRODUCTION.

Of the ancient and modern ſtate of Agriculture *in Scotland, and of the obſtacles to its improvement; with the plan of the preſent Publication.*

ENGLAND has been long conſidered as the School of Agriculture in Europe. Though perhaps not ſo early, yet it has been more rapid in its progreſs of improvement. Several cauſes have co-operated to bring this about. That liberty which the commons of England have long enjoyed, gave them a liberal thought, and an abſolute ſecurity of property, without which, induſtry of every kind, and Agriculture in particular, muſt neceſſarily languiſh. Another great cauſe was, the early patronage of men of rank and figure: When a reſpectable Judge of the ſupreme court of the nation adopted the practice of Agriculture, and, like Cato, deſcended from his bench to pen a Treatiſe of Agriculture, in its ſtile adapted to the capacity of his meaneſt brother in Farming, we may ſafely conclude, that Farming was then the *faſhion*; and what might not have been expected from ſuch examples? Judge Fitz-Herbert's Treatiſe, which was publiſhed by himſelf in 1534, has been followed by a great number of tracts on that ſubject, in ſo much, that the books on Agriculture, publiſhed in England, would form a little library. That ſpirit of enterprize which is characteriſtic of the nation, was eaſily awakened by ſuch examples,

and would readily attempt the *Ways to get Wealth* *, and attain to the *Infinite Treaſure* * held forth in the books of Farming; while their opulence or eaſy circumſtances ſecured the Farmers from the bad effects of a miſcarriage, or from being diſcouraged to reiterate the experiment.

While Agriculture, under the influence of theſe happy circumſtances, was making great advances in England, it lay totally neglected in Scotland: Without patronage, without example, and without the neceſſary aids, it behoved to languiſh and decay; for it may be aſſerted from the beſt authorities, that it was once not unknown and unprotected there. The Popiſh clergy had acquired an immenſe landed intereſt; it is believed near a third of the whole land-rent of Scotland; and they were not inattentive to the improvement of it: Being either foreigners, or educated abroad, they imported with them the beſt methods of cultivation then in practice; and were at pains to propagate them among their tenants: The rentals of church-lands bear teſtimony of the conſequent effects; theſe were under good management, affording great returns of the beſt grains; while the greateſt part of the country, excepting the ſmall territories of royal burghs, lay an uncultivated waſte.

The progreſs of improvement ſuffered a ſevere check by the convulſions that enſued at the Reformation. That event totally engroſſed the minds of all ranks: The great men, who parcelled out among themſelves the fair poſſeſſions of the church, were too much occupied amidſt the hurry of civil diſcord, and ſecuring the eſtates they had acquired, to think of reaping the proper advantages from their new acquiſitions; while the commons, who entered deep into the religious quarrel, became too much improvers of church and ſtate, to have either leiſure or inclination to improve their farms.

From

* Theſe are the titles of ſome of the books publiſhed about 130 years ago.

From this time, the Agriculture of Scotland fell into a languiſhing ſtate: There was no perſon of rank or ſpirit to take the lead: The profeſſion itſelf came into diſrepute; and remained for more than a century in the hands of the meaneſt country people, without precept, and without example, to incite them to a better and more ſpirited culture.

Yet, however inactive or ill directed the labouring hands of the country were, it muſt be acknowledged, that, during this period, the police and improvement of it were not altogether out of ſight. Many excellent laws were framed by the Legiſlature for encouraging the landed intereſt in the improvement of their eſtates, and ſecuring to them the benefit of theſe improvements. The laws for valuing and purchaſing of tythes; for encouraging and preſerving incloſures and plantations; for dividing of commons; ſome of which are as yet *deſiderata* in our ſiſter country; do great honour to the wiſdom of the adminiſtrations of thoſe times, whatever demerit theſe may have had in other political matters. Theſe ſalutary laws, however, contributed very little towards promoting a general ſpirit of improvement; nor is it eaſy to account for the blindneſs of the country to their real intereſt, in not greedily embracing the advantages laid open to them by theſe laws: Whether that it had an unſurmountable diſtruſt in laws formed by men whom they abhorred, and from whom they could not believe that any good thing could proceed; Or that, being wholly poſſeſſed with the important concerns of liberty and religion, which was apprehended to be in danger, they had not leiſure to attend to leſſer matters; which could abide till times of greater ſecurity; Or that it muſt be aſcribed to a moſt condemnable inactivity and indolence, deſtructive both of private intereſt and of the general good of the community; certain it is, that the benefit of theſe laws was totally neglected; and though wiſely calculated to lay the ſureſt foundations for a real improvement of the country, ſeemed to be reſerved for an age leſs ſubject to prejudice, and more given to activity and enterprize.

The

The Union, which gave life and encouragement to the manufactures and commerce of Scotland, was equally propitious to its Agriculture. The intercourſe betwixt the two nations having become more frequent, many of the nobility and gentry, catched with the view of the cultivation in England, early began to make trials upon their own eſtates, what the ſoil, and what the climate would bear. A more vigorous cultivation was attempted by the introduction of incloſures, plantations, and cultivated graſſes; and the proſpect bid fair for a reformation in Farming: But the ſucceſs was not anſwerable to the ſpirit with which theſe eſſays were undertaken. The want of a practical knowledge and attention to matters of Agriculture in gentlemen themſelves; the ignorance, inſincerity, and infidelity of ſervants; the want of that opulence and wealth which had early encouraged and ſupported Agriculture in England; and above all, the little encouragement for improvements in a country where trade and manufactures were but in their infancy; all contributed to render many of theſe attempts abortive, and ſhattered the private fortunes of ſeverals. Improvers came to be conſidered as men of deſperate adventure: Improvements fell into univerſal diſrepute: The general prejudice in the minds of the common Farmers againſt innovations was thereby more ſtrongly rivetted; and every attempt to go out of the beaten tract was treated as ridiculous.

In the mean time, a ſet of gentlemen, of a truly publick ſpirit, formed a ſociety for the improvement of Agriculture; and having themſelves practiſed it upon rational and juſt principles, endeavoured, by their example and inſtructions, to propagate the ſame ſpirit through the country. Many gentlemen applied to them for advice; and with a juſt liberality of ſentiment, every perſon was made welcome to a participation of their beſt ſkill; and, in conſequence thereof, many laudable attempts towards improvement in this practical branch of ſcience were made in different parts of the country.

The

The advantages to be reaped from ſuch a ſociety, and from ſuch examples, did not, however, much affect or alter the uſual ſyſtem of the common Farmers. Two prejudices ſtuck with them, that were real ſtumbling-blocks in their way; How ſhould gentlemen, not bred to the plough, know any thing of Farming? And the ſucceſs that attended their endeavours, was aſcribed, not to their ſuperior ſkill, but to their ſuperior affluence and command of money; which, in the opinion of the Farmers, was wantonly, and, if all coſts were cleared, would be found unprofitably beſtowed.

The great improvements made upon many of the landed eſtates in Scotland by the proprietors, and the conſequent riſe of rent, have at length convinced the Tenants, to their coſt, that they were wrong in both ſuppoſitions. Other cauſes have indeed combined to raiſe the value and increaſe the rents of lands, in many inſtances to double, yea, treble of what they yielded thirty or forty years ago. What muſt be the conſequence? The ſame ſlovenly, or ill directed management, which hardly enabled the former tenant to pay little more than a quit-rent, and yielded a very ſcanty and miſerable ſubſiſtence to him and his family, will never afford to pay the encreaſed rent, and, at the ſame time, the advanced price of every commodity neceſſary either for the Farm or the family, for which he muſt have recourſe to the market. The little circle, within which the Scotch Farmer formerly moved, muſt certainly be enlarged; a more active and vigorous cultivation muſt be introduced; and a more particular attention paid to the various branches of rural œconomy; otherways the buſineſs will never proceed with any advantage, either to the Farmer or the Landlord.

But this general cenſure does not affect the whole tribe of Farmers without exception. There are among them ſome men of real induſtry and enterprize, who practiſe Farming with ſpirit and judgment, and who very well ſecond the views, or ſupport the improvements made, or propoſed by their landlords: Theſe, however, bear but a ſmall proportion

to

to the whole. In general, the ſtate of Agriculture is extremely mean; and it may with ſafety be affirmed, that the improvement of Scotland owes nothing to the actual Farmers. The obſtacles that obſtruct it are various. A diſquiſition into theſe would not only be curious but intereſting. But as they differ in different places, a very thorough knowledge, and particular inveſtigation into the ſtate of Farming in the ſeveral counties, would be neceſſary to enable a perſon to diſcover the defects, and preſcribe the proper remedies. This has been attempted by a gentleman in Aberdeen-ſhire, with reſpect to the Agriculture of that part of the country, and his eſſay * has great merit. He has endeavoured to draw ſome concluſions reſpecting the general ſtate of Agriculture in Scotland; but he acknowledges his facts were too ſcanty, and wiſhes his endeavours might incite others, who may have better opportunities of information, farther to inveſtigate this ſubject. And were ſuch a plan followed out, by men of judgment and accuracy, ſo that a complete knowledge of the ſtate of Agriculture through Scotland could be obtained, great advantages would undoubtedly reſult from a comparative view of the improvements and defects that would be obſerved in different counties; as it is certain, that many good, and many bad practices which prevail in different places, need only to be pointed out, in order to be imitated, or avoided, by the intelligent Farmer.

Amongſt the ſeveral obſtacles that obſtruct the improvement of Lands in Scotland, this gentleman has claſſed the *obſtinacy* of common Farmers. His good ſenſe, however, inſtantly revolts at the expreſſion, and he reſolves it into *ignorance*, for which he offers an apology, and propoſes a remedy. His remedy, however, of ſetting down in Farms ſuch young men as have ſerved under Gentlemen Farmers, to become examples of better practices among their neighbours,

* It is entitled, A Diſſertation on the chief obſtacles to the improvement of land, &c. Aberdeen, 1760.

bours, has been frequently tried, but has rarely ſucceeded; and, it is to be feared, that the number of perſons in that ſtile, who can be found proper for this purpoſe, will be too few for ſpreading ſuch knowledge as may contribute to a general improvement.

How then is uſeful knowledge to be propagated among our Farmers? or, if it is offered them, will they reduce it into practice? Let us caſt about and ſee, if there is a probability of the one or the other.——Improvements in all arts are of ſlow introduction. At firſt, the ſucceſs of the execution is precarious; till, by length of time and frequent experiment, the whole circumſtances of the operation become familiar, and a facility of execution is acquired: Till then, many attempts will prove abortive; diſappointments will enſue; and a certain expence will be incurred. This holds in Agriculture as well as in all other arts †. The culture of Turnips was earneſtly recommended to our Farmers upwards of thirty years ago; but few of the trials, made either by gentlemen or Farmers, till of late, were attended with ſuch ſucceſs as to encourage a general practice; and none of them could compare with the great cropts now frequently to be ſeen on the grounds of actual Farmers. Improved Farming muſt begin with gentlemen of fortune, to whom a miſcarriage is of leſs moment. That the common Farmers ſhould expreſs a diffidence in matters that are new and untried, or which they fear are beyond their reach, is not then to be wondered at, nor are they on that account to be blamed as obſtinate. Experiments, the ſucceſs of which are at beſt precarious, are not their province, whoſe living

† Columella applies this maxim with great propriety and elegance to Huſbandry. "Uſus et experientia dominantur in artibus; neque eſt "ulla diſciplina, in qua non peccando diſcatur: Nam ubi quid perperam "adminiſtratum ceſſerit improſpere, vitatur quod fefellerat; illumi- "natque rectam rationem docentis magiſterium: Quare noſtra præ- "cepta non conſummare ſcientiam, ſed adjuvari promittunt: nec ſta- "tim quiſquam compos Agricolationis erit, his perlectis rationibus, "niſi et obire eas voluerit, et per facultates potuerit." Lib. 1. c. 1.

ing muſt depend upon their yearly gain. In matters within their knowledge they have ſenſe and ſagacity enough to attend to their own Intereſt; and if practices are recommended to them by repeated ſucceſs, either from their own obſervation or from unqueſtionable authority; and they ſhall be convinced that the execution is eaſy, and the expence within their reach; their timidity and diffidence will give way, and induſtry will undertake what reaſon and intereſt dictate.

If there is a probability then, that our Farmers will readily embrace and practiſe better methods of Farming, and will amend their preſent errors, had they an opportunity to know them; the duty which every man owes to his country, and the great calls it has for improvement in Agriculture, demand all the aſſiſtance that can be given to an end ſo deſireable, and ſo intimately connected with the very exiſtence of our manufactures, trade, and commerce.

The Agriculture of Scotland continues ſtill in the meaneſt hands: For although ſome Farmers, of more liberal ſentiment and greater induſtry and enterprize, are juſtly intitled to a conſiderable ſhare of merit, for the advances they have made in improvements; the deplorable ſtate in which the greateſt part of the country ſtill continues evidently demonſtrate a want of knowledge, and a want of induſtry in its poſſeſſors. The improvements made and practiſed, either by gentlemen or by the more ſpirited Farmers, are yet too ſcanty, to have any great influence in creating among them a general ſpirit of ambition and emulation. They have little call to go far beyond the limits of their Farms: And the utmoſt extent of their excurſions is to the pariſh-church or the next market-town; in which they ſee and meet with nothing beyond their own little ſphere of knowledge, and converſe with their brother Farmers, as low in ſentiment and as ignorant as themſelves. Thus they return home as little inſtructed as they went abroad, and of as little benefit to their Farm as the noxious weeds, which abſurd management has foſtered ever ſince the ſurface was firſt broke up by the plough.

In England, many books have been publiſhed of late, with the profeſſed purpoſe of inſtructing the Farmer in the univerſal ſcience of Agriculture: Their titles promiſe a great deal; but theſe ſyſtems, theſe complete bodies of Agriculture, have been juſtly cenſured as very unfit inſtructors for the actual Farmer: They may do very well for the amuſement of a gentleman in his country retirement; and may incite him to experiments, from which ſome new light, or ſome new diſcovery, may be ſtruck out for the general good. But, as they are moſtly compiled by men poſſeſſed with the rage of book-making; who thought it their duty to amaſs every thing that has been wrote or ſaid on their ſubject indiſcriminately, whether the offspring of fancy, or the reſult of experiment; inſtead of inſtructing, they could not fail to lead the ignorant Farmer into a maze of error and confuſion.

The *Muſeum Ruſticum* bid fair to become a very uſeful collection of practical knowledge in Agriculture. But, beſides that the plan of that collection comprehended alſo manufactures, trade, and commerce; the greateſt part of it reſpects a more improved ſtate of Agriculture than Scotland can yet boaſt of, and particularly the new or horſe-hoeing huſbandry; ſo as to be very improper for the inſtruction of that ſet of men we have principally in view: And many of their correſpondents having deviated into ſpeculation and argument, in place of facts and experiments, a ſpirit of contraverſy, altercation, and ill humour, was introduced, which derogated greatly from the worth and uſefulneſs of that collection.

In Scotland, we have been very ſparing of writings in Huſbandry. Excepting ſome ſmall tracts, that have been neglected as ſoon as they appeared, the only books of note are the Tranſactions of the Society for promoting Agriculture, publiſhed by Mr Maxwell; and the Rev. Mr Dickſon's late Treatiſe on Agriculture; not to mention Dr Home's Chymical Treatiſe, which is calculated for men of ſcience only, but by no means for popular uſe. Theſe works are too well known to require any encomium. However, without derogating from their me-

rit, without even inſinuating that they are ill calculated for promoting uſeful knowledge, it may be ſafely ſaid, that the inferior claſs of our Farmers (and they compoſe the greateſt part) are not yet in a condition to uſe theſe books with judgement, ſo as to profit by them. Where many circumſtances are to be conſidered, compariſons made, and judgments formed, the minds of rude and illiterate men are apt to be diſtracted and confounded, and rendered incapable of forming any regular concluſions. Inſtructions for ſuch men ought to be conciſe and diſtinct, founded upon a plain and ſimple detail of facts, and inforced by reaſons that are within their comprehenſion, and eaſily underſtood. When ſuch things come ſupported with the further recommendation of being already the conſtant practice of their brother Farmers in other parts, attempts to try them will be the certain conſequence of a conviction in their truth. A common Farmer will not eaſily comprehend the doctrine of the pabulum and the paſture of plants, and that dung and other rich manures encreaſe the one, and new lime and frequent plowings extend the other: But if he is told, that plentifull dunging, and frequent ſtirring the earth about them by hoeing, will ſecure him in a large cropt of Beans, Turnips, or Cabbages, and that by this management other Farmers have ſucceded to admiration, there is little doubt but he will profit by the advice.

But although the Huſbandry writings already publiſhed can hardly be expected to contribute much towards the improvement of our common Farmers, there are, however, in theſe books, to be found a great variety of obſervations and directions in all the branches of this buſineſs, already ſanctified by practice in our own and our neighbouring country, though unknown, or unattended to by them, that might prove very ſalutary and conducive to the end in view: Were theſe detached from the greater works, and put into the hands of our Farmers periodically, in a pamphlet form; by the ſmallneſs of the ſize, they would be induced to read them; nor would they be deterred by the expence from purchaſing them: This would be literally

literally bringing knowledge to their door; and there is little doubt, if it were thus offered, but they would readily graſp at it. In ſeveral places, they have already begun to form little clubs or ſocieties for a mutual communication of knowledge; and it were a pity, not to ſecond their wiſhes. Such a collection as propoſed, would greatly tend to enlarge their views; and would gradually introduce them into a habit and freedom of thinking and reaſoning upon what they heard and ſaw. Their prejudices in favour of inveterate uſages, however abſurd or unprofitable; and thoſe againſt innovations, even where recommended by the moſt cogent reaſon or eſtabliſhed practice elſewhere, would wear off: The different articles treated of, would become the ſubject of diſcuſſion in the club; and ſome of them would moſt probably be recommended to the different members for trial: The latent ſparks of induſtry would thereby be gradually awakened and put in action, or come to be more properly directed for their own and the general good; and inſtead of an ignorant, obſtinate, and indolent tenandry, we might ſoon ſee them active and laborious, and withal intelligent, and capable to give reaſons for what they do: And theſe expectations are the more ſanguine, that the preſent propoſition took its riſe from a hint thrown out in one of theſe infant ſocieties.

This makes it more than probable, that ſuch a publication, if executed with judgment, and a regard to the wants of the common Farmer, may contribute greatly to amend their preſent erroneous or defective practices, in which they drudge on like beaſts of burden; becauſe they have always followed the tract; and their fathers, who were as wiſe as they, did ſo before them.

But the benefit of it will not be confined to them alone. The Farmers of ſuperior rank, and even gentlemen of landed eſtates who practiſe Farming, may profit by it. They may have acceſs to, or may be poſſeſſed of many of the treatiſes and ſyſtems of Agriculture, which they are capable to peruſe with pleaſure

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and advantage: But mankind are either often too buſy, or too indolent, to venture on the peruſal of large works. The preſent mode of reading is too well known to extend little beyond a news-papers, a magazine, or a pamphlet; and in ſuch a publication, as is now propoſed, without obtruding upon their eaſe or their buſineſs, they will readily find the moſt material and important inſtructions in Agriculture, that have been publiſhed from the experience and practice of this and former ages. Beſides, though many of the practical obſervations that will fall to be comprehended in ſuch a work may be very familiar to ſome, they may be unknown to others; as many things daily and generally practiſed in one county or corner, may be very little, if at all, known, or heard of, in other parts of the kingdom.

Such a work, however, ought not be confined to what has been already writ and publiſhed in books of Huſbandry. Many perſons, wiſhing to promote the intereſt of Agriculture, and willing to oblige the world with their obſervations, have no opportunity to communicate them, but by the channel of a news-paper or a monthly magazine. In theſe fugitive publications, buried in the motly maſs of other matters, they are no ſooner read than they are forgot; nor can the Farmer, when he has occaſion for them, know or recollect where he can find them: Whereas, if repoſed in a miſcellany, dedicated ſolely to the purpoſes of Agriculture, he will readily reſort to it, and there will eaſily find what he is in queſt of.

Nor is it to be doubted, if ſuch a work was ſet on foot, that it would be deſtitute of correſpondents to ſupply it with ample and valuable matter. Having ſuch opportunity, they will readily embrace it; and by that channel, communicate to their brother Farmers, their obſervations and experiments; which will be the more valuable, that they are made upon ſoils, and under a climate, whoſe Agriculture it ought to be our wiſh, and certainly is our intereſt to improve. In this reſpect, the Farmer is a ſingular character: Exempt from that contracted jealouſy, ſo remarkable in moſt other profeſſions, who general-

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ly affect a myſtery in their buſineſs, he is free, open, and communicative, ready to aſſiſt his neighbours, not only with his labour, but with his advice: He looks not on their proſperity with the jaundiced eye of envy; but conſiders it as his own, and promotes it as far as lies in his power. From ſuch diſpoſitions of mind, a free communication of knowledge may juſtly be expected, if the Farmer is but convinced of the advantages that will reſult from it: Thoſe ariſing from a comparative knowledge of the Agriculture of a country have been already mentioned; and in this view, where any particular method is peculiar to one corner, and ſanctified by a ſucceſsful practice, the information of it cannot fail to be an uſeful and grateful ſervice to the public. Every man has not the opportunity or abilities to make experiments, and to ſtrike out new lights; but ſurely, what he daily practiſes, if ſingular and ſucceſsful, as it is well worth, ſo it may be communicated with very little trouble.

Experiments and new diſcoveries will deſerve a dignified place in ſuch a collection. The perfection which all arts and ſciencies, and Agriculture among the reſt, have attained, is no other than a combination of ſingle experiments and diſcoveries made at different places, and in diſtant ages, the hiſtory, and the authors of which, are now loſt in oblivion: Many of them of great importance, and the practical concluſions that were or might have been drawn from them, have no doubt died with the obſerver, either from not having been made known, or not having had a faithful record to preſerve them. Were ſuch as are now made to be publiſhed to the world, beſides their intrinſic worth, they may greatly contribute, not only to awaken the attention of ſeverals, who otherways would perhaps never

* Iſchomachus, that compleat huſbandman deſcribed by Xenophon in his œconomics, ſays to Socrates, "All other tradeſmen are at great "pains by all means to conceal the chief parts of their art: But if a "Farmer has either planted or ſown his fields with ſkill and propriety, "he is happy in having them inſpected; and when aſked, he will con- "ceal nothing of the manner by which he brought his works to ſuch "perfection."

never have wared a thought upon the ſubject; but to incite, others to extend the purſuit, and thereby enrich the common-ſtock with ſtill more ample diſcoveries. Even the tribe of common Farmers may thus in time be induced by example to make little trials, and to communicate the reſult, with their thoughts and obſervations on them, for the public benefit; and thereby remove the imputation, "That the generality of "them paſs away life, without making any reflections on "Agriculture, and grow old long before they have taken "leave of their infancy."

The principal difficulty will be, to overcome their aukward timidity of appearing in print, from a diffidence of their ſkill in writing: This may prevent many from attempting to publiſh what they are afraid may prove faſtidious to read: But if this diffidence and timidity can be vanquiſhed by their deſire to co-operate in promoting the general good, their productions will certainly enhance the value of ſuch a collection. They are undoubtedly poſſeſſed of a number of important facts not publickly known *, which, if narrated in a ſtyle that is but intelligible (and the meer inaccuracies of language, may, where neceſſary, be corrected by the publiſher), will carry a greater authority with them, than if attended with a pomp of words, or the parade of philoſophical reaſoning: "I take not the leaſt "offence at inaccuracies in ſtyle and phyſical knowledge, (ſays "Mr Harte), when I peruſe the writings of downright yeo-"men and Farmers. Such a plain practical author as Ga-

"briel

* Of theſe the knowledge of the management of ſheep-ſtock is all their own. Few gentlemen in Scotland have attempted that branch; and it is remarkable, that very little relating to it is to be found in the Engliſh books of Huſbandry; and that little reſpects only the fine Downs and rich paſtures that are uſed as ſheep walks in England, and will not apply to the mountainous and mooriſh countries of Scotland, where ſheep are chiefly bred. As attempts have been lately made to introduce the breeding and raiſing of ſheep in the north and weſt Highlands, and with ſome ſucceſs, inſtructions on that branch from the ſheep Farmers will be of great ſervice to prevent miſcarriages, which, among people little acquainted with the management of that ſtock, muſt be often inevitable.

" briel Plattes, pays his little contingent to the republic of " knowledge with a bit of unſtamped real bullion, whilſt the " vain glorious man of ſcience throws down an heap of glit- " tering counters, which are gold to the eye, but lead to the " touchſtone †.

They will likewiſe have an opportunity here to propound their doubts and queſtions, or even to require farther advice concerning any thing publiſhed in theſe papers that may be a novelty to them, and which they may want to try: And from the general taſte that now prevails for promoting the intereſts of Agriculture, many will be found ready and willing to comply with the requeſt of the honeſt countryman, by endeavouring to ſolve his doubts, and to promote his good intentions by their beſt advice.

The profeſſed purpoſe of the publication now propoſed, being, in the firſt place, to ſpread the knowledge of a better method of culture in the practice of the common huſbandry, amongſt our loweſt claſs of Farmers, who, it muſt be acknowledged, ſtand very much in need of inſtruction; and then to promote the introduction of ſuch parts of what is called the New Huſbandry, as are already approved of and ſupported by the practice and ſucceſs of ſome amongſt us, both Gentlemen and Farmers; and to be a ſafe and faithful repoſitory for preſerving the obſervations, experiments, and diſcoveries that ſhall be made in our own country, which muſt neceſſarily carry more faith and credit with them, than when made at a diſtance, on richer ſoils, or in a more benign climate, bids ſo fair for anſwering the end propoſed, that the publiſher entertains the moſt ſanguine hopes, it will receive the protection and patronage of all who are ſeriouſly engaged in the practice of Agriculture, and of all who wiſh well to their country, and rejoice to ſee its improvement.

To requeſt, in any more particular manner, the countenance of the landed gentlemen to ſuch an undertaking, is reckoned

† Eſſ. 1. p. 194.

reckoned ſuperfluous: Their private intereſt, as well as that of the public, is too intimately connected with its object, to think they would overlook an opportunity of increaſing the ſphere of knowledge, and thereby raiſing a ſpirit of well-directed induſtry among their tenants, whereby their eſtates will be improved in the cheapeſt and moſt effectual way to themſelves, and in a manner that muſt beſtow the higheſt ſatisfaction to a generous mind; as it will contribute, at the ſame time, to encreaſe the felicity of numbers of poor people, whom Providence has placed under their protection.

Some attention is requiſite on their part; and they ought, in prudence, to afford every encouragement, and remove every obſtacle that may obſtruct its operations.

Two miſtakes are found generally to prevail: The favourite topick of the Landlords is, that the lands in Scotland are not riſen to near their value; while the popular clamour is, that lands are already brought to a rack-rent; in ſo much, that now the tenandry cannot live by them. Both may be in part true; but it would be dangerous for either of them to be adopted abſolutely or indiſcriminately. That there are ſome rents in Scotland already higher than any in England, all circumſtances conſidered, is more than probable; but that the average of the rents in Scotland is far below its value, the daily improvements that every where occur, and the great extent of uncultivated grounds, that yet wait the hands of the improver, leave little room to queſtion.

It often happens, when gentlemen are poſſeſſed of ſuch improveable eſtates, that a Land-Doctor is conſulted; and he, from a ſuperficial view of the grounds, by riding them once over, pretends to acquire ſuch perfect knowledge of their nature, as to enable him at once to ſay, in what manner the farms ſhould be parcelled out, how they ſhould be managed, and what rent each parcel ſhould afford: From this flattering report a reſolution is immediately formed; and the tenants put under the hard neceſſity, either of giving up their farms, or of paying a great additional rent. To compel them to the

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firſt is hazardous; and a riſk is run of laying a large extent of land waſte. A new tenandry is not eaſily or readily to be imported into an eſtate; and the experiment is dangerous. But though it could be done with advantage, the preference is rather due to the ancient ſtock.

The attachment to the natal ſpot is a principle deeply rooted in human nature, and is productive of much good. It is this idea which, being more and more extended and enlarged, becomes that diſtinguiſhed virtue, the love of country, which beams forth ſo reſplendent in more exalted minds: It operates very ſtrongly amongſt the inferior claſs of mankind, and ought by all means to be encouraged in this its loweſt ſtate. When this is accompanied with a veneration for an ancient family, betwixt whom and their predeceſſors, the relation of Maſter and Tenant has ſubſiſted for many generations; or with a thorough perſuaſion, that their landlords are ſeriouſly intereſted in their proſperity; in ſuch circumſtances, rather as change their home and their maſter, they will ſubmit, without much reluctance, to any reaſonable encreaſe of rent, or any particular mode of management, that lies within their abilities; in which their chance of ſucceſs is much greater than that of ſtrangers, who are unacquainted with many of the peculiarities of ſoil and climate that require a practice of ſome years thoroughly to underſtand. Such new impoſitions however ſhould at firſt be proportioned to their ſtock and to their knowledge: They may afterwards be encreaſed; but ſo as never to keep faſter pace than the improvements that may reaſonably be expected: And thus the tenants will be induced to become gradually and inſenſibly laborious, induſtrious, and ingenious; and a ſurer foundation will be laid for the landlord, in time, to reap the full benefit of his eſtate in an eſtabliſhed and well paid rent; while he has the generous ſatisfaction of contributing to the felicity of thoſe, the fruits of whoſe labours he enjoys; and who will thus be attached to him by the ſtrongeſt ties of intereſt and gratitude.

On the other hand, if from an avidity to graſp the immediate and utmoſt advantages promiſed him from his eſtate, a landlord ſhall be induced to impoſe rents upon his tenants higher than either their preſent ſituation, or that of the grounds can bear, without conſidering, *Quid ferre recuſent, Quid valeant humeri*, a very few may perhaps weather the ſtorm; but the greateſt part, finding themſelves overwhelmed, will either be reduced to a rechleſs ſtate of deſperate indolence and inactivity; or moved by a ſpirited reſentment of their wrongs, will change, not their native barony, pariſh, or county only; but will reſolutely migrate to other climes, and ſeek that ſubſiſtence for themſelves and families among ſtrangers, which was denied them in their native country; thus bereaving the community of many uſeful members, and weakening that branch of it, whoſe vigorous and active ſtate is neceſſary for the preſervation of the whole.

And here the tenure, by which Tenants hold their Farms, deſerves a very ſerious conſideration. The great charm, which ſets induſtry every where in motion, is the acquiſition of property, and the ſecurity of it when acquired. Where Tenants hold by a precarious tenure, and are removeable at the will of their maſters, or after a ſhort period; then, undoubtedly, their labours will be ſpiritleſs and languid, as they have no inducement to enter upon improvements, of which they have no certainty of reaping the immediate benefit. If from native activity and a deſire to thrive, a Tenant is induced to labour hard, to bring his Farm into good order by any laſting operations, without ſuch ſecurity, he runs the greateſt riſk of being obliged ſoon either to remove, or to pay his Landlord the price of his own labour, in an additional rent. Mr Harte's obſervations on this head, are well worth tranſcribing. "When any conſiderable improvements are made by a Farmer, "we are often perſuaded to raiſe his rent too ſoon; and, like "Eaſtern Monarchs, tax his induſtry, and puniſh him for "growing wealthy. This is unkind as well as impolitic "uſage: For the more ſuch a Huſbandman gains, the more,

"generally

" generally ſpeaking, he becomes vigilant, frugal, and indu-
" ſtrious. In proportion as the Farmer thrives, the land im-
" proves: And this is the meaning of the French proverb,
" *Tant vaut l'homme, tant vaut la terre.* Such a man be-
" ing placed above the fear of want, has the means of hiring
" better ſervants, and maintaining a larger ſtock of cattle;
" making or purchaſing manures; trying experiments, or
" deviſing improvements. In proportion as he cultivates more
" land, he acquires more knowledge, and gains greater pro-
" fit; till, at length, he begins to love Huſbandry, and values
" himſelf on a profeſſion which increaſes his little ſtores, and
" gratifies his vanity into the bargain. Under ſuch a cultiva-
" tion, you ſee, in one place, waſte lands rendered arable, or
" converted into artificial paſture: This is a true conqueſt; an
" acquiſition and appropriation, which enriches his landlord
" and himſelf, but injures no man! In another place, he fer-
" tilizes a parched ſoil by floating it, or bringing little
" ſtreams to run through it, feed and cloath it with whole-
" ſome verdure; or elſe drains moraſſes, where abundance
" of the ſame water is a nuiſance; and decorates the ſoil
" with rich crops of uſefull vegetables; as flax, hops, cole,
" and rape; inſtead of flags, moſs, ruſhes, and brambles:
" Such a Tenant ought to be patroniſed, and not diſcouraged:
" For every eſtate, *brought thus into heart*, as the country-
" man expreſſes it, may be continued on the ſame, or a like
" footing, eaſily and cheaply, for a conſiderable number of
" years; ſo that the rent of the eſtate, when occupied by another
" at this man's death, may be increaſed, in all probability,
" 10 *per cent.* It is therefore of dangerous conſequence to
" perſuade great men, miniſters, and princes, that *poverty*
" is advantageous to poor Farmers; and that want and diſtreſ-
" ſes animate their activity; that neceſſity will make them
" docile and tractable; and that they may paſs through the
" ſtage of life beſt, when they are laden with the heavieſt bur-
" dens; whereas, it is well known, that the poor Huſband-
" man can ſteer his courſe ſucceſsfully enough, without car-
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"rying ſuch a weight of ballaſt. Let us therefore charitably "place this matter in another light; and, if Farmers, who "literally ſupport the heat of the day, are ſo unhappy as not "to ſhare the eſteem of the nobility and gentry, yet they "have a claim at leaſt to the favour of miniſters, and the pro-"tection of princes: For though there may be ſubjects of "more conſpicuous talents; yet two thirds of mankind will "be found leſs uſeful to ſociety." * And a little after, he ſays, "I have ever looked upon the poor laborious Huſband-"man, as a moſt uſeful being in all ſocieties; and happy "would it be, if we could contribute to enrich him, and the "land poſſeſſor, at the ſame time; which muſt always hap-"pen, if Huſbandry is carried on in the manner it ought to "be. I am here ſpeaking chiefly of the loweſt claſs of Huſ-"bandmen, the little Farmers, who rent L. 30 or L. 40 a "year. Such a man works and fares harder, and is, in "effect, poorer than the day-labourer he employs. An "Huſbandman, thus circumſtanced, is, beyond diſpute, a "worthy object of our commiſeration and aſſiſtance. He "is an uſeful, tho' inviſible, wheel in the machine of ſtate." †

Theſe obſervations are juſt and true, and require no commentary. The author mentions Farmers of L. 30 or L. 40 a-year as the loweſt claſs in England. But in many parts of Scotland, theſe would be reckoned *Great Goodmen*: In the greateſt part, they are of the middling claſs; and great numbers will be found poſſeſſing Farms of not a third or fourth part of that rent, while they conſiſt perhaps of three or four times the extent of ground, the greateſt part which lyes in a ſtate of nature, or ſubject to that moſt irrational and infrugal diviſion of *infield* and *outfield*. Where an eſtate conſiſts of many ſuch Farms, it cannot be expected that the landlord, though he were to dedicate his whole time and attention to it's improvement, can extend his operations to any conſiderable part of it. The bulk muſt be left in the hands of Tenants; and where ſuch is

* Eſſ. I. p. 202. † Ib. 205.

is the caſe, nothing can be propoſed that appears more propitious to the intereſts of both landlord and tenant, than letting out the lands upon long leaſes, or for a certain number of years, to terminate with one or more lives.

This method would in a great meaſure ſuperſede the neceſſity of fettering the tenant with a great number of conditions and obligations, many of them perhaps inconſiſtent with the nature of the Farm, and many of them capricious. An obligation on the tenant, to have his whole Farm incloſed and ſubdivided within a certain number of years; to have, at the termination of the leaſe, a certain quantity of ground in ſummer-fallow, or what in modern practice is found by experience to be equally advantageous to the ground, and more profitable to the tenant, in clover or fallowing cropts; preſerving the fences and buildings; and ſome ſuch ſimple obligations that may be conſiſtent with the condition of every ſoil or ſituation, may ſupply the place of the moſt anxious covenants that ingenuity can deviſe, or an exceſs of anxiety can dictate. The tenant would naturally be as forward as his landlord's wiſhes, to commence his works, and to perſevere in them with aſſiduity, from an aſſurance of the future profit that is to redound to his family: The barren heaths would be converted into arable or paſture grounds; the abſurd and infrugal diſtinction of *outfield* and *infield* grounds, the bane of Scots Agriculture, would be obliterated; and the whole Farm brought equally into heart; whereby a real acquiſition would be made, not only to the private eſtate of the landlord, but to the community.

If a life or lives are ſuperadded to the definite term of years, this would become an additional ſecurity to the landlord, that the Farm is to return to his family in the beſt condition and under the beſt culture. The ſtricteſt obligations on the Tenant that can be contrived, though they may prevent his hurting the Farm, by a courſe of what they call *ſcourging cropts*, near the end of his leaſe, which is generally and juſtly complained of; they cannot however prevent him from relaxing in his labour, his induſtry, and his vigilance. But when

when the poſſeſſion is to have the ſame termination with the life of the Tenant, which the author of nature has wiſely concealed from mankind; that portion of hope, which, by our conſtitution, is mingled in the cup of life, and all along had animated his labour, will keep his induſtry and attention awake, ſo as to preſerve the Farm in the ſame good condition, in which he would always wiſh to poſſeſs it.

Is it not ſurpriſing then, when this method of letting lands is apparently pregnant with ſo many advantages, and has been ſo long and warmly recommended, that it has never obtained among us; notwithſtanding that our neighbours in England have long ſet us the example, and owe their moſt conſiderable improvements to it?

But all that can be propoſed or done for theſe poor people of the inferior claſs of Tenants, (and the greateſt part of the Tenandry of Scotland are of that ſort), will avail little till they are made ſenſible of their abject and miſerable condition, and are animated with ſome degree of ambition to amend it. They dwell in huts built of mud, that are dark, dirty, and comfortleſs; and their food is of the meaneſt ſort, being little other than bread and water; their higheſt notions of living is to obtain *Milk and Meal*, as their phraſe is, which, with perhaps a few potatoes, is the height of their luxury; never having either a bit of fleſh-meat, or a cup of generous liquor to grace their board, that they may be invigorated for their work, or refreſhed after their fatigue: Thus their wants being circumſcribed within narrow bounds, their induſtry, which will always be proportioned to their wants, is extremely limited; and theſe being ſatisfied, and the rent payable to the landlord ſcraped together, their ambition is gratified; and the reſt of their time is ſpent in ſordid indolence and inactivity.

It is certainly a matter of great moment, and is certainly much in the power of their landlords to introduce and propagate among them a better taſte and reliſh of life; and from experience it is affirmed, that nothing will contribute more to improve that taſte, and enlarge their ambition, than affording

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ing them, in the firſt place, decent and comfortable houſes to live in; by incloſing their grounds, and encouraging them to the culture of roots, and cabbages, which, by the horſe-hoeing Huſbandry, is now ſucceſsfully introduced into the fields, a greater variety of wholſome food will be obtained; and by degrees and inſenſibly they may be brought to entertain a a pride, not of *Living* only, but of *Living well.*

The attention and compaſſion of Landlords towards their Tenants, cannot be more powerfully incited, than in the words of that elegant writer, the Reverend Mr Harte, ſo often cited, in his pathetick apoſtrophe addreſſed to them, wherein he has painted the contraſt in the moſt ſtriking colours.

" * A conſiderable number of the great and opulent not " only abandon their fellow-creatures in the country, but " conſider them almoſt as inferior beings of another ſpecies; " As *hewers of wood and drawers of water;* whom they " partly neglect and partly deſpiſe; when, at the ſame time, " they feaſt upon the animals that theſe poor laborious people " have nouriſhed, riot in wines that their ruſtic hands have " preſſed, and ſleep at eaſe upon *that very down* which came " firſt from ſome *miſerable cottage.*

" To ſuch of the great and opulent as are here deſcribed " (though ſtill there are reaſons to hope that the number of " them is not large) it is no ways our intention to addreſs the " following eſſays; but apply ourſelves rather to the ſenſible, " reflecting, and compaſſionate, who poſſeſs large tracts of " land, and have many huſbandmen and labouring peaſants " dependant on them. Theſe great and good perſons cannot " help recollecting, that they owe not only their bread, but " the delicacies of their table; the delicious flavour of their " wines, fruits, and garden-vegetables; the raiment that " cloaths and adorns them; the fire that warms them; the " tapers that yields them light; the ſoftneſs of their ſleep; " the magnificence of the equipage that draws them; and a " part of the medicines that give them eaſe:—That they owe " them.

* Eſſ. I. p. 32.

" them, I ſay, to the care, induſtry, perpetual labours and
" attentions of their poor neglected fellow creatures, who
" want almoſt every comfortable bleſſing which they ſupply
" abundantly to their ſuperiors. For the main, that theſe care-
" ful pains-taking drudges require, is coarſe cloathing enough
" to keep them warm, and humble food ſufficient to pacify
" the demands of hunger: and thus (in many countries at
" leaſt, or, in other words, in every part of *Europe* but *Eng-*
" *land*) they rarely taſte of that wheat which their hands have
" ſown, or the fleſh of the cattle which they have bred up
" and nouriſhed with ſo much care and anxiety. *Bleſſed is he*
" *who ſhall conſider ſuch poor and needy*, induſtrious contri-
" butors to the eaſe and well-being of thoſe who are more for-
" tunate and opulent; *the Lord ſhall deliver him in the time*
" *of trouble.!*"

Theſe are the people for whoſe benefit this preſent work is primarily intended: And if it ſhall be thought to merit the countenance of the public, ſo far as to encourage the publiſhers to proceed in it, the utmoſt attention ſhall be paid to the ſelection of ſuch inſtructions and obſervations from the various books of Farming, as may tend moſt directly to amend the errors or ſupply the defects of the common Huſbandry as preſently practiſed among them. And if, by his endeavours, he can have the ſatisfaction of contributing in any degree to encreaſe their induſtry, or give it a more proper direction, where it is often to the Farmer's loſs unprofitably beſtowed, he has his Reward.

To render the benefit of this collection more extenſive, and that it may be uſeful to Gentlemen and Farmers who ſtand not in need of theſe more ſimple inſtructions, it is propoſed to inſert in it ſuch experiments and obſervations as are publiſhed either in England or Ireland, or among ourſelves, which their importance and utility may ſeem to recommend. Thus the reader will be furniſhed with many valuable tracts, which otherways he may have little chance ever to ſee, and many uſe-

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ful eſſays that have appeared only in News-papers may be preſerved from oblivion for future uſe.

The nature of the plan now propoſed, and the advantages that may reſult from it to the country, will excuſe the requeſting in the moſt earneſt manner the correſpondence of all thoſe, who, making Agriculture their ſtudy or their profeſſion, may be poſſeſſed of important facts, ingenious obſervations, or the reſult of experiments made either by themſelves, or by their friends, whoſe veracity and exactneſs may be relied on. Mankind are not all formed of an enterprifing and obſerving ſpirit, or calculated to take the lead: Some are led by precept, while others require the force of example to make them act. Hence appears the advantages to be reaped from ſuch communications. Many will be thereby tempted to try the things recommended, which will beſt be confirmed by repeated experiment; and perhaps ſome new light may be ſtruck out from them, unthought of or unheaded by the firſt obſerver. Beſides, the province of experiment is the lot of but a few: If the trial is bleſt with ſucceſs, the liberal and benevolent mind will be impatient till it is made known for the public good; and the publiſhers flatters themſelves, that this work, dedicated ſolely to Agriculture, will be eſteemed the moſt proper channel for conveying them to the world, and a faithful repoſitory for preſerving them.

It is not however from new diſcoveries alone, that the great improvement requiſite for the Agriculture of this country is to be acquired. A faithful account of the ſtate of Farming, in the different counties of Scotland, would greatly contribute to correct what is wrong, and to propagate more generally what is right. The Farmer would be thereby led to enter upon the compariſon of the practice of his own with that of other counties; and the preference will undoubtedly be given to that which appears beſt. This is a branch of intelligence that every Farmer who can write is capable of affording to the public: And as the trouble will be but ſmall, it is hoped the proſpect of the Good it may produce, will incite many to attempt it.

The more general that the Correſpondence now requeſted becomes, the more uſeful it will be. The Editors ſhall gratefully receive the favours of their Correſpondents: and will be greatly obliged for their counſel and advice; which will not be raſhly rejected, nor any thing omitted, that promiſes to be uſeful or really curious in any branch of the buſineſs; ſo as to render this a complete Magazine of Farming Knowledge for the inſtruction and amuſement of perſons of all ranks concerned in it.

And that ſuch perſons as wiſh to promote the intereſt of Agriculture, and are capable to contribute their ſhare by a communication of part of their knowledge, may be at no loſs in the choice of a ſubject, we have ſubjoined a liſt of Leading Queſtions in Agriculture, upon the plan propoſed in the *Muſæum Ruſticum*, which will in ſome ſort ſerve as a directory to our Correſpondents.

ARTICLE II.

Leading Queſtions in Agriculture.

Of UNCULTIVATED GROUNDS.

1. WHAT proportion does the cultivated lands in each county bear to the uncultivated?

2. In what manner can the nature of land be judged of by the plants it produces, and by their vigor?

3. What part of the uncultivated lands may be improven, and converted to tillage or good paſture; and what is it worth *per* acre?

4. What is the moſt proper method of breaking up ſuch uncultivated land; and the moſt proper cropts for it?

5. What improvement can be made on theſe parts that are unfit for tillage?

6. What are the trees moſt proper to be planted on the different kinds of moor-grounds that are unfit for tillage?

MOSSES.

MOSSES.

1. WHAT improvement can be made on moſſes, moraſſes, or bogs?

2. What is the cheapeſt and moſt effectual method of draining them?

3. Which are the moſt proper cropts; and the beſt courſes of cropts for drained moſſes?

4. How to prevent them from running again into their own natural ſour graſſes and weeds?

5. What trees will thrive upon them; or upon other moiſt grounds?

CULTIVATED GROUNDS.

1. WHAT are the different kinds or qualities of the land in different counties?

2. What is the common rents of cultivated or arable lands in different counties?

3. What are the grains or cropts principally raiſed?

4. What are the courſes of cropts, or the order of ſowing the ſeveral kinds of grain *or other cropts* in the ſame lands?

5. What is the common rate or quantity of ſeed uſed on different grounds in different counties?

6. What is the common increaſe of the different grains ſowen?

7. What is the uſual times of ſowing, and of reaping?

8. What method of ſowing has ſucceeded beſt on various ſoils; and at what depth is it beſt to lay the ſeed, under the different circumſtances of ſoil, ſituation, &c.?

9. How often do the Farmers change their ſeed, and from what diſtance; and the advantages ariſing from it?

10. What are the different kinds of manures uſed in different places; and the quantities uſed for an acre?

11. What

11. What is the beſt method of collecting and preparing natural manures?

12. Do we not ſometimes find under the ſurface a different kind of earth proper to ſerve as a manure?

13. In what places are the ſeveral kinds of marle found; at what depth, what are their qualities, and to what uſes are they applied?

14. What are the materials uſed for the compoſt-dung-hills, and the manner of uſing them?

15. What compoſts are beſt adapted to each ſoil?

16. In what proportion ſhould the different kinds of manure be uſed on different ſoils; and what manure is beſt adapted to each ſoil?

17. In what manner, and at what ſeaſon, ſhould manures be ſpread?

18. What are the effects of the different kinds of artificial manures; as coal, wood, or peat-aſhes, tanner's-bark, pot-aſhes, &c. on different ſoils; and the quantities uſed for an acre, with the expence?

19. Are green cropts of peaſe, tares, or buckwheat, ever uſed to be plowed in when in full ſap, for a manure, for a wheat-cropt, or otherways; and what is the expence and profit?

20. Is burning of ground, or what is called in England Burnbaiting or Denſhiring, uſed in any part of Scotland; and what is the expence of it; and what is the ſucceſs?

21. What are the courſes of plowing for each kind of grain, and the uſual ſeaſons for it?

22. Are more frequent plowings than commonly practiſed ever uſed; and what are their effects?

23. What degree of harrowing is beſtowed on the different grains according to the ſoils?

24. Is any kind of dreſſing uſed for preparing the ſeed, particularly wheat-ſeed, before ſowing; and what is its effects?

25. What grains are found to ſucceed beſt in different ſoils and ſituations?

26. What is the beſt method of clearing corn-lands from weeds?

27. What weeds are moſt pernicious to the cropt and to the ſoil; and how are they beſt deſtroyed?

28. What are the diſtempers to which the cropts are moſt ſubject while in the field; and the proper remedies?

29. What is the beſt method of preventing ſmut in wheat?

30. What is the beſt method to prevent the fly on turnips?

31. What is the moſt advantageous method of cutting the grain in harveſt?

32. Are any kinds of grains uſed to be mowed with the ſcythe; and the ſucceſs and expence of it?

33. What conſtruction is beſt for a granary, ſo as to keep corn in a ſmall compaſs, and without danger?

34. In what manner can corn be beſt guarded againſt the ravages of inſects in the granary?

35. What is the beſt method of laying down ground to graſs, either for hay or paſture?

36. What plants are moſt valuable for paſture, and beſt adapted to the ſeveral kinds of ſoil?

Of FLAX and HEMP.

1. WHAT is the beſt method of preparing land for flax and hemp; and might not the huſbandry of theſe plants be improved?

2. What manure agrees beſt with them?

3. What is the beſt time of ſowing flax and hemp?

4. How ſhould they be managed while on the land?

5. What care is requiſite in pulling them; and if hemp ſhould not be pulled at two ſeaſons according to its ſex?

6. What is the beſt method of dreſſing flax and hemp for the various purpoſes for which they are uſed?

7. In

7. In what manner could the culture of theſe uſeful plants be beſt encouraged ?

8. What proportion does the value of theſe cropts bear to the expence of huſbandry, &c. employed in them ?

9. What is the kind of flax-ſeed that ſucceeds beſt in this country; the Dutch, Livonian, or Philadelphia ſeed ?

10. What are the defects of flax-ſeed that may be eaſily diſcovered by the buyer ?

Of INSTRUMENTS of HUSBANDRY.

1. WHAT are the different ſorts of inſtruments of huſbandry uſed in the different counties of Scotland ?

2. What are the beſt forms of ploughs, harrows, and other common inſtruments, regard being had to the ſoil they are to cultivate ?

3. What proportions and conſtructions are beſt for carts, waggons, tumbrils, &c. uſed in carrying dung, gravel, earth, corn, or fodder ?

4. Is the drill-plough in common uſe in any part of Scotland; and is its conſtruction ſo ſimple as to encourage the common Farmer to adopt it ?

5. What are the prices of the ſeveral inſtruments of huſbandry in different places, their qualities being deſcribed ?

6. What is the moſt proper plough, or other inſtrument, for raiſing the turf of land in order to its being burnt ?

Of NOXIOUS INSECTS.

1. WHAT are the moſt noxious inſects of this country; and which are thoſe which have, as it were, ſtated returns ?

2. When are they moſt numerous; and what circumſtances are moſt favourable to their increaſe ?

3. What are the inſects which breed on particular plants, and feed on them; and are noxious to corn and graſs ?

4. What

4. What are the beſt methods of deſtroying them, of leſſening the damage done by them, or preventing them from injuring our cropts?

Of LABOUR.

1. HOW is labour performed in the country, by the day or by the piece; and what is the rate of the ſeveral kinds of labour in each way, proper regard being had to the diſtinctions of age, ſex, ſtrength, and abilities of the labourers, and the ſeaſon of the year?

2. What alterations have there been in this matter, and owing to what cauſes?

3. What are the yearly wages given to ploughmen, thraſhers, carters, labourers, maids, boys, and other houſehold country-ſervants, in different counties?

4. In what manner are they fed by their maſters?

5. At what times in every county are the ſeveral works in farming performed; as ploughing, harrowing, ſowing, manuring, &c.?

6. In what order ſhould theſe works be performed, ſo as to be moſt ſucceſsful, and at the ſame time at the leaſt expence of time and money?

7. In what manner might children of different ages be moſt profitably employed in the buſineſs of Farming, ſo as not to hurt their growth and future health?

Of CATTLE.

1. WHAT is the beſt form of ſtables, cow-houſes, ox-ſtalls, covered ſheep-pens, &c. regard being had to the conveniency of ſituation, with reſpect to the dwelling-houſe, and to each other, the ſaving trouble in attendance, the health of the cattle, ſaving the dung, &c.?

Of

Of Horſes.

2. HOW ſhall the breed of horſes among the common Farmers be improved?

3. What kind of fodder and keeping is beſt adapted to work and draught horſes?

4. To what particular diſorders are horſes ſubject in the ſeveral counties; and what are their cauſes, and remedies?

5. What kind of geer or harneſs is beſt for draught-horſes, ſo that they may uſe their ſtrength to the greateſt advantage?

6. In what manner ſhould young horſes be fed and trained to exerciſe, regard being had to the work they are intended for; and how ſoon ſhould they be put to work?

7. How many hours in the day are horſes commonly kept at work?

8. When uſed alone, how many are put to a plough; and how much do they plow in a day in different ſoils?

Of Oxen.

9. HOW ſhall the breed of black cattle be improved, either for the purpoſe of draught, or of feeding?

10. What is the proper age to put oxen to work?

11. What fodder is moſt proper to feed or fat them with; and which is the beſt and cheapeſt method of doing it?

12. What diſtempers are oxen uſually ſubject to in the ſeveral counties; and what are their cauſes and remedies?

13. In what manner can they be yoked, ſo as to uſe their ſtrength to the greateſt advantage?

14. When employed with horſes in the plough, what number of each are uſed; and how much do they plow a-day in different ſoils?

15. In what caſes are horſes or oxen to be preferred, one to the other?

Of Cows.

16. How much milk do cows generally give in different places at a meal?

17. In what manner are cows managed at different ſeaſons of the year?

18. What kind of fodder makes them give the beſt milk, and moſt in quantity?

19. What are the diſtempers of cows, their cauſes and remedies?

20. What is the proper age at which to put cows to the bull?

21. What are the proper marks of a good bull?

22. In what manner is the beſt butter and cheeſe made in the different counties; and how ſhall theſe manufactures be improved?

Of Sheep, Goats, and Hogs.

23. Of what kinds are the ſheep bred in the ſeveral counties?

24. What kinds of paſture agree beſt with ſheep?

25. What are their diſtempers, their cauſes and remedies?

26. May not ſheep be introduced into an improved farm, and made a neceſſary part of ſtock in Scotland, as is done in England; and the method of doing it?

27. Of the method and advantages of folding them on arable land?

28. Is the milking of ewes an advantage or diſadvantage to the Farmer?

29. What is the beſt winter-fodder for ſheep?

30. What is the beſt method of ſpending turnip with ſheep?

31. What neceſſity is there for ſmearing ſheep; and what is the beſt method of doing it for the ſafety of the ſheep, and of the leaſt prejudice to the wool?

32. Which is the beſt method of waſhing and ſhearing ſheep?

33. Under what reſtrictions may goats be admitted into a farm?

34. How is the greateſt advantage to be made of the wool and goats hair?

35. What is the proper management of goats?

36. In what manner are hogs fed and fatted to the greateſt advantage?

37. Under what reſtrictions may they be permitted to graze in the fields?

38. What are the different kinds known in Scotland; and may not the breed be improved?

Of POULTRY.

1. WHICH is the beſt method of breeding, feeding, and fattening fowls, turkeys, ducks, geeſe; and may they not be reared to the advantage of the Farmer?

2. What are the diſtempers of poultry, their cauſes and remedies?

Of BEES.

1. MIGHT not bees be kept in many places with great advantage and little trouble?

2. What is the beſt form of bee-hives?

3. What is the proper management of bees, and the beſt expoſure for their hives?

4. How is the greateſt advantage to be made of the honey and wax?

Of FARMS.

1. WHAT is the common extent of farms in the different counties, and the rent?

2. What is the common proportion betwixt the arable and paſture grounds in different places?

3. What is the proper proportion that ſhould be obſerved betwixt the arable and paſture grounds in farms of different ſizes and qualities?

4. What ſum is uſually employed in ſtocking farms of different ſizes and qualities?

5. What number of beſtial, inſtruments, quantity of corn, &c. is requiſite for different farms?

THE SCOTS FARMER,

NOVEMBER, 1772.

ARTICLE III.

Of Vegetation—the food of Plants—the paſture of Plants—the method of preparing the vegetable food for the nouriſhment of Plants. Dickſon's Agriculture, vol. I.

THE proper foundation of the ſcience of Agriculture is facts and experiments. From theſe have been deduced general concluſions of the manner of Nature's operations in promoting vegetation: and thence reſult the particular rules and inſtructions, neceſſary for directing the Farmer in his works. That theſe may obtain a ready reception, the authority of great names is not ſufficient: it is neceſſary that the practical Farmer be convinced, that they are conſonant to reaſon, and calculated to ſecond Nature in her operations: but unleſs he knows ſomething of vegetation, and the ways by which it is promoted, he can but ill judge whether they are ſo or not. The Rev. Mr Dickſon has furniſhed a very proper ſyſtem on that head, founded on and ſupported by practical obſervations, that are open to every common Farmer. It has been therefore adviſed, to introduce this collection, with an abridgement of what he has wrote on that head; leaving out, however, the philoſophical arguments he was obliged to advance, in order to refute the opinions of others, who entertained different ſentiments; and it will, at the ſame time, ſerve to give the farmer a diſtinct notion of ſome terms, that may occur in the courſe of Huſbandry Writings.

Of Vegetation.

AGRICULTURE is an art, by which the earth is aſſiſted in the production and nouriſhment of uſeful plants. That this may be performed in the moſt proper manner, it is neceſſary to know, by what methods vegetation is promoted, what are the impediments of it, and how they may be removed.

As plants puſh their roots into the earth, and by them receive nouriſhment, their vegetation may be promoted by the following methods: By communicating to the earth their proper food; by opening the earth, and thereby allowing them to extend their roots in ſearch of their food; and by diſſolving the vegetable food in the earth, and fitting it for entering their roots.

Experience teaches us, that vegetation is promoted by all theſe methods; for by the application of ſome manures we can improve the moſt barren land, and render it fertile; and by the culture of ſome kinds of plants, can reduce the ſame land to its originall barrenneſs. This ſhews, that the food of plants may be communicated to the earth, and that thereby vegetation is promoted. The great advantages, which it is obvious are gained by dividing the particles of the earth, whether this is done by tillage, by manures, or by froſt, ſhow that vegetation is alſo promoted by allowing plants more eaſily to extend their roots in ſearch of their food. And by the application of ſome manures, we can make land exert itſelf beyond its natural ſtrength in the nouriſhment of plants, and thereby reduce it to a greater degree of barrenneſs than it is poſſible to do without their aſſiſtance. This ſhows, that there is ſometimes vegetable food in the earth undiſſolved, or in ſome form that prevents its operation; and that by diſſolving it, or ſome way bringing it into action, vegetation is likewiſe promoted.

I. *Of the food of* PLANTS.

Various have been the opinions what this vegetable food is. Some are of opinion, that water is the food of plants; others contend for air; a third ſort for earth; a fourth for oil; and a fifth for ſalt *: And ſome, that the food of plants is a compound of all theſe. Each of them ſupport their different opinions by various obſervations and experiments; and when theſe are conſidered, we cannot but allow that ſome of the things mentioned actually contain the vegetable food; and that the others are neceſſary ingredients in it. When we conſider that plants are actually nouriſhed by earth; that they are alſo nouriſhed by water; and that the earth is rendered fertile by the air; we cannot but allow that each of theſe in ſome ſenſe may be called the food of plants; and that all of them contain this food. And when we conſider, that earth is rendered fertile by being mixed with oil and ſalt, and rendered poor and barren, when theſe are extracted; we muſt alſo allow, that theſe things in ſome ſenſe may likewiſe be called the food of plants; or at leaſt are neceſſary ingredients in it.

How this vegetable food is to be encreaſed in places where it is required, is the next enquiry. That it is lodged both in the earth and the air is without doubt; and that it obſerves a conſtant rotation, being conveyed regularly from the earth to the air, and from the air to the earth: A conſiderable

* The Farmer, and perhaps ſome others, who never heard of the different kinds of ſalts mentioned by chymiſts, may apply this to ſea-ſalt, or kitchen ſalt only: That is indeed a great fertilizer of land, could it be got in ſufficient quantitys, and properly applied. But Salt, in the ſenſe here applied, is a general principle, which is found to enter the compoſition of all bodies, animal, vegetable, and mineral. And it is believed, that the ſalts, which are ſuppoſed to be chiefly nitrous, are acquired by expoſing bodies to the air, a very principal ingredient in the food of Plants.

ſiderable quantity of it is conſtantly carried from the earth to the ſea by rivers, and this is reſtored to the earth by fiſh and ſea-weeds, or conveyed to the air by exhalations.

There are two different ways by which it may be encreaſed where needed; either by managing the ſoil in ſuch a manner, as to enable it to attract this food in greater plenty from the air; or by mixing with the ſoil ſuch bodies as contain thoſe ingredients of which the vegetable food is compounded.

That the air contains this vegetable food, may be concluded from ſeveral reaſons: The following ſhall ſuffice: Some land has been in graſs for hundreds of years, and the graſs continues to be very rich; and ſome has been many years in tillage, perhaps ſome hundreds likeways, and during that period, at leaſt for the laſt ſixty or ſeventy years, has not received any manure, and yet continues to carry good crops. That the crops carried off vegetable food is certain; and from whence can it be ſuppoſed that the land received a ſupply, but from the air. It is a practice in ſeveral parts of Scotland, to build their houſes of mortar made of earth mixed with ſtraw; and to cover their houſes with divots or turfs: The rubbiſh of theſe walls, though the earth of which they were formed was originally poor, is a very rich manure; and that of theſe roofs is reckoned very good, though the turfs were taken from a barren muir. To theſe may be added, that when land has been manured, by having cattle or ſheep folded upon it, the parts of the field, where the earth of the fold dykes has been laid, tho' expoſed only for one ſeaſon, is found as well manured as the other parts that have been dunged by the ſheep or cattle. In theſe caſes it ſeems evident, that the earth has been rendered fertile by its expoſure to the air.

If to theſe things it be added, that land, by being allowed to reſt for ſome years, becomes more fertile; it is plain that the

the air is full of vegetable food. It is from the air that the earth is ſupplied; for this vegetable food is ſucked in by the earth, as it touches its ſurface; and it is carried down by the dew, the rain and the ſnow; and thus the earth, by this conſtant ſupply of vegetable food which it receives from the air, is enabled to nouriſh a conſtant ſucceſſion of plants.

The earth by culture may be enabled to receive this food in greater plenty. If land is frequently ſtirred and turned over, the vegetable food in the air will have eaſier acceſs, and will be attracted by the earth in greater plenty. When land is allowed to lie long without being ſtirred and turned over, plants grow upon it; theſe carry off part of the food, and alſo by covering the ſurface, prevent in ſome meaſure the earth from attracting it from the air. But when land is frequently ſtirred and turned over, the plants that grow upon it being torn up and covered, are corrupted, and thereby obliged to reſtore the food they have taken; and the ſurface being always kept open, the vegetable food in the air finds eaſy acceſs. Beſides, the ſurface being kept rough and uneven, a greater quantity of the ſoil is thereby expoſed to the influence of the air; and ſome parts being raiſed above others, are fitted for intercepting the vegetable food, as it is driven along by the winds. To this it may be added, that earth, according to the quantity of vegetable food which it has abſorbed, loſes its power of attraction; and therefore every time that the ſurface is changed, earth with a ſtronger power of attraction is preſented to the air; and thereby a greater quantity of vegetable food received, than if the ſame ſurface had remained.

Land is enabled to receive this food from the air in greater plenty, not only by ſtirring and turning it over, but alſo by mixing with it ſuch bodies as have a power of attracting this food. There are a variety of bodies found from experience to have this power; ſuch as lime, chalk, and marles. Theſe, though they do not contain any vegetable

getable food in themſelves, yet communicate this food to land, by the power which they have of attracting it from the air.

That earth is enabled to receive the vegetable food from the air in greater plenty, both by frequently ſtirring and turning it over, and by mixing it with certain manures, is confirmed by obſervation and experience. Fallowing land is a cuſtom that now prevails in many places; and even that kind of land, that is moſt free and open in its nature, is found to be rendered more fertile by it: And it is likeways a cuſtom in many places, to uſe lime for a manure; and it is found that the land is enriched by it. As it contains no ſalts and oils, which are the ingredients principally wanted, it is obvious, that it muſt encreaſe this food by communicating to the earth a ſtronger power of attraction.

The other method of increaſing the vegetable food, is by mixing with the earth ſuch bodies as contain the things of which this food is compounded. There are a variety of bodies that contain theſe things: Among others, all kinds of dung, vegetables, and animals: Theſe things being mixed with the earth, and conſumed or corrupted, their juices are abſorbed by it, inſtead of flying off into the air. This the experience of all times and all places confirm. Theſe bodies are univerſally uſed as manures, and all kinds of ſoil are rendered more fertile by them.

II. *Of the Paſture of* PLANTS.

The ſecond method of promoting the vegetation of plants, is, by opening the earth, and allowing them more eaſily to extend their roots in ſearch of their food; and the ſpace where they do ſo is called their paſture. Though it may be allowed, that plants receive ſome part of their nouriſhment from the air, yet they receive the greateſt part of it from the earth. Plants feed by ſpreading their roots in the earth: Theſe roots are ſo many mouths which receive the

the vegetable food; they attract and ſuck in the juices and ſmall particles of matter that touch them; the ſtronger the plant is, it puts forth the greater number of roots, and extends them to the greater diſtance; and the greater number of roots any plant has, and the farther it extends them, the greater quantity of food it receives.

The roots of plants are tender; they cannot pierce any thing that is very hard; there muſt be cavities, and theſe cavities large enough to allow them to extend themſelves: If there are any pieces of the earth, where plants grow ſo very hard that the roots cannot enter, the plant receive no food from them. If the cavities are larger than the roots, the plants can receive no food, but from the ſides of the cavities that are touched by them. From thence it appears that land may have plenty of vegetable food, and yet a ſmall paſture: the particles of the ſoil may adhere ſo cloſe together, as to make it impoſſible for the roots of plants to ſeparate them; or the ſoil may be of a ſpungy nature, and its pores much larger than the roots that ſhould receive the vegetable food. It appears alſo, that the ſoil that has the largeſt paſture, is the one that has the greateſt number of cavities, and theſe cavities of ſuch a largeneſs as is beſt adapted to the ſize of thoſe roots that receive the vegetable food.

As the food of plants may be enlarged by art, ſo likeways by art their paſture may be enlarged: This is done by ſtirring and turning over the ſoil in which they feed. If the ſoil is ſo hard, and the vacuities ſo ſmall, that the roots of plants cannot enter them, the ſtirring and turning it over enlarges theſe vacuities, and encreaſes their number, and thereby renders the ſoil more free and open; for every time that the ſoil is ſtirred, new pores are opened, and ſome of the old ones enlarged. If in any ſoil there are pores that have no communication with the reſt, the ſtirring and turning over the ſoil opens this communication; for every time that the ſoil is ſtirred, ſome of the partitions betwixt the pores

are

are broke, and the roots of plants have thereby acceſs to the encloſed pores and the vegetable food contained in them.

On the other hand, if the ſoil is ſoft and ſpungy, that is, if the pores and vacuities are too large, the ſtirring and turning over the ſoil breaks the vacuities, makes them ſmaller, and thereby renders the ſoil more firm and ſolid; for every time that the ſoil is ſtirred, the vacuities are cut, ſome particles of earth forced into them; and thereby, in the place of one large vacuity, ſeveral ſmaller ones are formed.

Beſides, by being frequently ſtirred and turned over, the ſoil is better expoſed to the influence of the air, which has a natural tendency to diſſolve and ſeparate its particles. The natural gravity and attraction of the particles of the ſoil, act directly contrary to the air; the one makes theſe particles continually to adhere to each other, and preſſes them together, till the ſoil becomes as ſolid as its nature will allow, or till it is reduced to its natural paſture; and the other ſeparates theſe particles, and by degrees reduces them to atoms. When land is allowed to lye untouched, the natural gravity and attraction of the ſoil by degrees prevail, and render the ſoil firmer; and the air by degrees likewiſe is prevented from acting. But when the land is frequently ſtirred and turned over, the air has liberty to penetrate the ſoil, and acts upon a larger quantity of it in the ſeparation of its particles. It is certain that a piece of the hardeſt ſoil, when expoſed for ſome time to the air, falls down in a powder: in like manner, when land is turned up in hard pieces, and the ſurface left rough and uneven, the air is allowed to have its full influence upon it; but if left long untouched, the ſurface by degrees becomes ſmooth, the air is excluded, and the natural gravity of the ſoil prevails.

That the paſture of plants is enlarged, both in hard and ſoft land, by ſtirring and turning it over, is confirmed by experience. It is found, that ſtiff clay land, by being frequently plowed, becomes more ſoft and free; and that ſoft marſhy

marſhy land, by being frequently plowed, becomes more firm and ſolid; and that plants more eaſily find their food in both theſe kinds of ſoils, when thus reduced, than when in their natural ſituation.

The paſture of plants is alſo enlarged by the application of dung and other manures; for theſe being mixed with the ſoil raiſe a fermentation, by which the particles of earth being ſeparated from each other, the paſture is thereby enlarged. If the ſoil is hard and ſtiff, the ſeparation of its particles by fermentation opens the pores, and renders it more free and open; and if the ſoil is ſoft and ſpungy, the fermentation ranges its particles in a more regular manner, and thereby renders it more firm and ſolid.

III. *Of the methods of preparing the Vegetable Food for the nouriſhment of* PLANTS.

The third method of promoting the vegetation of plants, is, by diſſolving the vegetable food, and fitting it for entering their roots.

The vegetable food is in a variety of forms; ſometimes there is plenty of it in land, but in ſuch a form as renders it uſeleſs, ſometimes hurtful. This is the caſe with land, which is full of uncorrupted vegetables. Experience teaches us, that vegetables, when mixed with any ſoil, render it more fertile. It is natural to infer from this, that vegetables are food to vegetables, as animals are food to animals: To render them proper food, it is indeed neceſſary, that they be diſſolved, their parts ſeparated, and thereby fitted for entering the ſmall pores of roots; and this is effectually done by corruption. Now, if any land is full of vegetables, it may be ſaid to contain vegetable food; and if theſe vegetables are undiſſolved, it may be ſaid, that this vegetable food is in a ſtate that renders it uſeleſs; and if they are not only undiſſolved, but alive and draw nouriſhment from the land to ſupport them,

it may be ſaid, that the vegetable food is in ſuch a ſituation as renders it hurtful. When the ſoil has in it a great mixture of moſs, which is now allowed to be an uncorrupted vegetable, it may be ſaid to have vegetable food in an uſeleſs ſtate; and when it is much infeſted with weeds, it may be ſaid to have vegetable food in a hurtful ſtate. To prepare the vegetable food in ſuch land for the nouriſhment of plants, the land muſt be managed in ſuch a manner as to reduce the vegetables to a ſtate of putrefaction, The ſtirring and turning over the ſoil frequently will have ſome influence; for thereby the weeds are deſtroyed, and they muſt be deſtroyed before they will putrify. But that which has the greateſt influence is, the application of ſuch bodies as are found to have a power of diſſolving vegetable ſubſtances; and lime is the principal thing for this purpoſe.

But land may be likewiſe ſaid to contain vegetable food in a ſtate that renders it uſeleſs, when it contains oils, but theſe oils undiſſolved. It is obſerved, that oil is one of the principal ingredients of the vegetable food; and that, to fit it for entering the roots of plants, it is neceſſary that it be diſſolved by ſalts. By the operations of ſome kinds of manures, it appears, that ſome land in this ſituation contains a greater proportion of oil than its ſalts are capable to diſſolve. To prepare the vegetable food in ſuch land for the nouriſhment of plants, it is neceſſary to provide ſalts to diſſolve its oils. The changing the ſurface, and expoſing the ſoil frequently to the influence of the air in the winter and ſpring, has ſome effect: for in theſe ſeaſons the ſalts in the air are moſt prevalent. But the application of lime, and the other manures that ferment moſt violently with acids, is the moſt proper thing for this purpoſe; for by this fermentation, the ſalt wanted is actually produced.

ARTI-

ARTICLE IV.

Proportion between the arable and graſs lands of a farm—Arrangement of crops—Great importance of working with Oxen:

YOUNG's Farmer's Letters *to the people of* England.

IT is a matter of infinite conſequence to the nation, that every huſbandman in it ſhould cultivate his farm in a neat and maſterly manner; that no part of the ſoil may be exhauſted by noxious weeds, and prevented from yielding its full produce: or, in other words, that every farmer may be enabled by his profits to proceed in his buſineſs with ſpirit: for if he does not make a reaſonable profit, the ſtate muſt ſuffer. It is therefore highly important, that ſuch courſes of agriculture be recommended to them, as will tend to advance the rural œconomy of this country to the higheſt pitch: ſuch courſes as are practiſed by the few who have a true idea of experimental huſbandry.

One of theſe chief points which tends to render huſbandry profitable to its profeſſors, is a due proportion between the arable and paſture lands of a farm. Without this advantageous proportion, there cannot be that general benefit, which ariſes from a judicious *arrangement* of a farm. I have already proved the greatly ſuperior profit of a grazing one; and all the arguments which I *then* uſed, are of force *now*, in ſhowing the benefits of any quantity of paſture. It is a miſerable thing to have the farmer depend entirely on the plough for his All; eſpecially the little or middling ones. By having a proper quantity of graſs, his dependencies are divided—he is not ſo liable to be totally diſappointed in his crop—his immediate profit is much greater, and his conſequential benefit greater ſtill. For it is his paſtures which maintain cattle——and it is on cattle he depends chiefly for a ſufficient quantity of manure.

manure. But when all, or nearly all the land of a farm is arable, it is twenty to one but the ſoil is quite exhauſted in a term of years, unleſs the management is very maſterly, and the purchaſed manures conſiderable.

From the beſt obſervations I have been able to make, I have great reaſon to believe, that half the lands of a farm, but more particularly of a ſmall or middling one, ought to be graſs. A multitude of advantages reſult from ſuch a diviſion; both arable and paſture then mutually aſſiſt each other in forming a great quantity of manures. The arable, in furniſhing turnips for the winter-ſubſiſtence of the cattle, and ſtraw for them to make into manure; the graſs, in maintaining cattle in the ſummer ready for ſpending the arable produce of fodder, ſtraw, &c. And without this diviſion of a farm, the occupier muſt ſuffer. It ſhould be remembered, that clover will not anſwer the purpoſes of natural graſs; for I know of no cattle that can be fed to advantage on it but horſes, ſheep, and hogs—neither cows nor neat cattle. But in this caſe, as before, I always except farms ſituated on a poor ſoil. Thoſe farms which have two thirds, or three fourths, of the land ſmall graſs, would be yet more profitable to the occupier—but as I before obſerved, not ſo advantageous to population.

Another circumſtance, which depends on the farmer's management, and is of no ſmall conſequence, is the arranging his lands properly for his crops. It is common in ſome countries to ſow little beſides wheat; having nearly one half of the land under that crop, and the other half fallow, for the reception of the next year's†. And in others, where this practice is varied, it differs chiefly in ſometimes ſowing oats, —and in others, barley. However, the fewer the diviſions of the farm, the leſs in general the profit.

It

† This obſervation applies chiefly to England: but in many parts of Scotland the caſe is ſtill worſe, the principal crops being barley and oats; and the principal part oats, which is reckoned an impoveriſhing crop: peaſe and beans being rarely ſown, and Turnips not known.

It muſt be obvious, that the fewer the diviſions of a farm into different crops, the more horſes muſt be kept for cultivating them; becauſe the buſineſs of ſowing comes too much together, and if a ſufficient ſtrength of plowing-cattle is not kept, the ſeaſon will paſs without the ſeed being in the ground; and the conſequence of that is, the land's being ſown at an improper time. Whereas, if a diviſion of the farm is made into a variety of parts, for different crops, the ſeaſons for ſowing them being different, the fewer horſes will do. For inſtance:

Suppoſe one hundred acres of arable land, belonging to a farm, be divided into three portions of thirty three acres each, one ſown with wheat, one with ſpring corn, and the other fallow; the horſes muſt neceſſarily, at any ſowing time, have that quantity of land to cultivate at a time: This is ſeldom done in common, with leſs than ſix horſes, or three ploughs, and often with four: And in tickliſh ſeaſons it will require that number. Let us now inquire what number will do if differently managed.

One hundred acres of arable land might be cultivated with one plough and a pair of ſtout horſes‡, by dividing them into eight portions: but as two horſes would be inſufficient for carrying out manures and other carting, not leſs than four would be entirely proper; but that number would fully anſwer every purpoſe. The land ſhould be divided thus: of each 12½ acres. 1. Beans, ſown in February. 2. Black oats, the

‡ This will ſtartle moſt of the Farmers in Scotland; but their ſurpriſe will abate, when they are informed, that this practice is now ſucceſsfully introduced into Scotland; and with ploughs properly conſtructed, and an expert ploughman, the work is more expeditiouſly and more perfectly performed, than by four; and ſtill more than by a plough, dragged at the tail of twelve, fourteen, or ſixteen oxen, goaded up by four or five men, as in the north of Scotland.

the latter end of February, and the beginning of March, 3. Barley in April. 4. Turnips in June and July. 5. Wheat in September. 6. Peaſe in October and November*. 7. A clover lay, one year old. 8. Ditto, two years old. By means of ſuch huſbandry, the land will always be kept clean, and in heart, becauſe the crops which impoveriſh the earth, thoſe of wheat, barley and oats, are not out of proportion to the reſt.

I leave it to the reader to judge what a ſaving it is to the farmers, inſtead of ſix or eight horſes, to keep only four; and to fat four heifers, or oxen, or keep four cows, in the room of the four uſeleſs horſes. That ſuch a ſaving would be very conſiderable, is apparent on the very firſt view: and I am well ſatisfied that the attentive obſerver in moſt countries will remark, as great a loſs as this I have ſtated in the article of uſeleſs horſes.

Horſes are kept at ſuch a great expence, that it is to be wondered huſbandmen in general do not, in that reſpect, better ſee their own intereſt: for they ought always to be employed, or they can never pay for their food; and in the common manner of managing a farm, they ſtand ſtill a great part of the year, for hurrying on the buſineſs of a few weeks at the ſowing-times; which tends to the great impoveriſhment of the farmer.

But he does not ſuffer only in the uſeleſs horſes he keeps, but in the haſte with which he plows and ſows his land—— for having a great deal to do in a ſhort time, moſt of it muſt be incompletely done, notwithſtanding the number of his horſes; and in the articles of harrowing and rolling, he is very deficient; whereas, if he was to vary his crops more, he would of courſe have more time for each, and all would be conſequently better conducted. There is not a more pernicious piece of ill management in huſbandry, than by dilatorineſs or other means to be ſtraitened for want of time; the work

* It is a common practice in Suffolk and Eſſex, to ſow grey peas as ſoon as wheat-ſowing is over.

is never well done——the land is plowed wet——harrowing is ommitted; and the ſoil, inſtead of yielding a beneficial crop, is filled with trumpery and weeds for years to come. Whenever a farmer is in ſuch a ſituation, he had infinitely better let alone ſowing the field, though it be for a year. In all the extent of huſbandry, there is not a more important truth than this; nor is any thing more common than ſuch bad management, in barley ſeed-time particularly: heavy rains are then frequent, and land which has been carefully plowed, harrowed, and laid dry ready for the barley-ſeed, is prepared at ſuch an expence that few farmers can perſuade themſelves to forbear ſowing. But I have often obſerved, and experienced it in my own practice, that one very heavy ſhower of rain, coming juſt upon a harrowing, or while the field is plowing, and the ſeed poſſibly ſown, has deſtroyed the crop; inſomuch, that land which ought to have yielded four quarters *per* acre, has not produced one. In lands, whoſe ſurface bake with a hot gleam of ſun after much rain, this is univerſally the caſe; and frequently with all ſoils inclinable to wetneſs, though they have not that quality. When rain comes in this manner, the farmer goes home with his teams, and leaves the field until it is dry enough to proceed, and then the ſowing buſineſs goes forward; ſome ſlight ſhowers come; it is late in the ſeed-time, and he cannot regard theſe; the ſeaſon, upon the whole, is very wet; but the ground is ſeeded and left to its chance. A very poor crop is the infallible conſequence; if the farmer gets one quarter, where he had reaſon in a dry time to expect four, he is well off.

I muſt here beg leave to remark, that the caſe I have been ſtating is by no means an uncommon one: laſt barley ſeed-time excepted*, there has not been a favourable one to ſoils wet, or inclinable to moiſture, theſe ſix years: for of a variety of fields, I have carefully remarked, both at ſeed-time and harveſt,

* This was wrote in the year 1768.

veſt, I remember not one *capital* crop of barley raiſed in any one that was not ſeeded quite dry, and a week at leaſt, or ten days dry weather after the ſowing. All the good crops of this grain in bad years, on clays, or heavy loams, or binding gravels, are thoſe which are ſown early, before the heavy ſpring-ſhowers.

The conſequence, therefore, of not varying crops, is ſurely evident: inſtead of ſowing 20 acres of beans and peaſe, and 20 of barley, the farmer ſows 40 of the laſt; this hurries him at a time when every moment is precious; if a rainy ſeaſon comes on, this crop is loſt. It matters not having plowed his land for a twelve-month paſt, made it clear of all weeds, and garden fine; one week of very wet weather at ſeed-time would ruin the crop upon a fallow of ſeven years.

But if the crops are varied, yet ſome land muſt be left for barley; and with many ploughs, and but little land to ſow, I have more than once in wet ſeaſons loſt my crop, and found many neighbours in the ſame predicament. Whenever I am again caught in ſuch a wet ſeed-time, I ſhall certainly leave the land for turnips, or wheat, even if the fallow is a year and a half old: I would perſuade every one to do the ſame, for the benefit of the practice I am clear would be very great: nor ſhould the land's being ſown, occaſion a different conduct; three buſhels of barley cannot be valued at more than 7 *s.* 6 *d.* ſuppoſe we ſay four buſhels and 10 *s.* this loſs is trifling in compariſon to that of ſuffering half, or a quarter of a crop, to occupy land that is in excellent order, and which would certainly produce fine turnips or wheat. But if the farmer cannot bring himſelf to paſs by a ſpring-ſowing; the great thing wanting in this part of huſbanday, is ſome crop that ſuits moiſt and wet land, and that will bear ſowing ſo late as the latter end of May, or beginning of June: ſuch a ſuccedaneum would be of incomparable value, when a wet ſeaſon had rendered the barley ſowing dangerous, or deferred it till late, which is the ſame thing. Buck-wheat is

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preciſely the crop on light lands, but will not do on heavy ones; nor does the cauſe operate in the manner above deſcribed, on light ſoils, which will bear rain at any time ſo much better than heavier ones. Oats, peaſe, beans, and tares, ſhould all be ſown, even before barley.

Horſes are ſo extremely expenſive in the food they require —in the expence and wear of their harneſs—in their ſhoeing —and above all, in the variety of diſorders, lameneſſes, and deaths they are ſubject to; that I think it is of vaſt conſequence, both to the farmer and the public, to extend the uſe of oxen for all rural buſineſs.

Oxen are kept infinitely cheaper than horſes. Their harneſs and ſhoeing coaſt leſs—they are not near ſo ſubject to illneſs and being lame—and if lameneſs does overtake them, or they grow too old for work, they then remain fit and ready for fatting. Their ſummer food, like that of horſes, conſiſts of graſs, but without any hay or oats: in winter, good ſtraw and turnips, or carrots; if no roots, then hay alone. In reſpect to attendance, the difference between horſes and oxen is very great; one ſtout lad is ſufficient, in a convenient ox-houſe, to take care of eight or ten oxen; they requiring no other attendance, than putting their fodder in their racks, and cleaning the houſe; no rubbing or currying or dreſſing, which with horſes takes one man to every four or five at moſt.

The harneſs of oxen (that is their yokes, bows, and chains) coſt leſs by two thirds than the harneſs of horſes, and what is as material, require ſcarcely any repairs; whereas the horſe-harneſs, every practical huſbandman knows, is a conſtant rent-charge; every part of it conſtantly going to pieces, and not mended under a great expence. The ſhoeing is equally in favour of the oxen, not coſting ſo much as that of horſes, and laſting longer.

The circumſtance of fatting them when paſt work, is of moſt material conſequence. It is well known how great a loſs a farmer ſuffers that keeps many horſes, by their dying and becoming diſabled. In a large buſineſs, this, in a term

of twenty years, becomes an object of great importance, and were it divided, would make a conſiderable annual charge. Now with oxen the caſe is totally different. If accidentally they get lame, to which, however, they are not ſo ſubject as horſes, or when they abate of their vigour at work, the farmer fattens, and ſells them as well as the beſt—and no beaſts fat kindlier than thoſe that have worked.

It has been objected, that oxen are not proper for all work ——and in the horſe-counties there is quite an abhorrence againſt their uſe: It is there aſſerted, that they are by no means equal to horſes. But I have myſelf found the contrary, as well from my own experience, as the information I have gained from the beſt hands. A pair of ſtout oxen will plow as much as a pair of horſes, and, unleſs the horſes be ſtrong and ſteady ones, carry a deeper and ſtronger furrow. But when we read in Liſle of eight and ten oxen to a plough, it raiſes one's indignation. Either the ploughs at that time in Hampſhire, muſt be of a ridiculous conſtruction, or the ſoil rock itſelf. I have, indeed, found in other parts of England, that it is yet the practice to plow with a great many oxen at a time: but, as I remarked before, I have experienced in ſeveral ſoils, that where a pair of ſtout horſes plow an acre a day, a yoke of oxen have done the ſame.

They are preciſely as convenient and effectual in all other rural buſineſs: in the waggon, in carts, and tumbrills, in rollers, &c. and uſed with as much eaſe and handineſs as any horſes.

One additional expence attending them, it would, however, be unfair to ſuppreſs: a pair of horſes in the plough require only the plowman, but a yoke of oxen muſt have a boy alſo to drive them. In the ox-counties, this expence amounts to a penny or three half pence, I am told, per journey of eight hours: but where I have any knowledge, could not be procured in the villages under two-pence or three-pence, and ſome times a groat: but clear I am, that this additional expence

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(when at plough) does by no means reduce them to a par with horſes: but if a great number of ox-ploughs were kept in ſome places, I doubt whether the procuring driving-boys, would not be a difficulty: and this circumſtance ought to induce ſome cultivator that works a great number, to try if they could not be guided by a line, like horſes.

I am the rather induced to hint this, as it is the actual method in uſe, in the province of Poitou in France; where the plowman not only holds the plough, but drives the oxen †. Such excellent cuſtoms are of great value; for ſavings of this ſort, are matters of no ſlight conſequence, to a hard-working frugal cultivator; beſides, the teaching beaſts ſuch a docility, is a pleaſing piece of ingenuity, and, I am perſuaded, is no difficult matter to effect.

Laſtly, the public is nearly concerned: for among the many cauſes that are daily mentioned, to occaſion a high price of butchers meat; I have not heard the great number of horſes that are kept, aſſigned as one I have reaſon to believe the number of them encreaſes greatly in moſt parts of the kingdom: this is an immenſe loſs to the community, in the vaſt quantities of horſe meat raiſed on land, where more valuable corn for exportation might be cultivated, were the work in general performed by oxen; and not only ſo, but the oxen themſelves would be perpetually coming to the ſhambles, yielding thereby a great encreate of butchers meat; but this is never the caſe with horſes—their carcaſes are conſigned only to the kennel.

Think what an immenſe ſum is loſt to the nation, in the vaſt quantity of land taken up in raiſing oats for the maintainance of theſe horſes; much of it, I know, of a poor ſort not fit for wheat; but infinite tracks that are, and moſt of it proper for barley. If the great quantity of land ſown with oats were reduced a third part, and inſtead thereof ſown with barley, rye, or wheat for the purpoſe of exportation, the wealth it would bring to the nation would be very great.

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† *Princ. et obſervat. œcon.* tome 2. p. 57.

This immenſely important object of public welfare can, in any degree, be affected only by reducing the number of horſes uſed in huſbandry, and ſubſtituting oxen in their ſtead. The infinite variety of beneficial effects that would reſult from this alteration are manifeſt; and if the reduction of the prices of proviſion is an object of earneſt attention, there is no method ſo ſure and eligible as encreaſing the number of working oxen. A very ſmall reduction of the number of horſes, and uſing oxen inſtead of them, (for inſtance, one tenth part) provided the land ſown with oats to maintain them, was ſown with wheat, rye, and barley for exportation, would not only give a great increaſe of butchers meat, but alſo yield at the loweſt, one million and a half annually clear profit to the nation.

For we ſhould conſider that a vaſt proportion of the land, which bears this immenſe quantity of oats, being rich, and able to produce wheat——a great deal of it proper for barley, and nearly the pooreſt of it ſufficiently good for rye; a proportion of it may certainly be deducted on paper without the imputation of arranging lands for exportable corn, not good enough to bear it. I am alſo ſenſible that it will be objected, to be impoſſible always, inſtead of oats, to ſow wheat, even on wheat-land, becauſe oats are frequently ſown after wheat. But then it ſhould be remembered, that the farmer's keeping a number of horſes renders an oat-crop abſolutely neceſſary: in determining the courſe of his fields, he fixes on a certain quantity of land for oats, which muſt be raiſed, or bought, a thing which few farmers like: and if he be a good huſbandman, he will abhor the practice of ſowing ſo voracious a vegetable after wheat, but ſow them after a fallow or ſome meliorating crops; indeed oats, by a prudent neat farmer, are never ſown on land which would not produce either wheat, barley, or rye.

But ſuppoſing they are generally an after-crop; there is an infinite difference to the public, as well as the cultivator, between

tween ſowing them, or beans, peaſe, or turnips, becauſe, after a good crop of peaſe or beans, in rich lands, wheat is again ſown, and after turnips barley. But when oats come in between, the ſoil is thereby ſo impoveriſhed, that a fallow muſt enſue, before any exportable corn can again be ſown.

A ſlight calculation will manifeſt the prodigious benefits ariſing from converting a part of the oat land to the growth of wheat. Upwards of 1,400,000 acres are ſown every year with oats:

	£.
A third of the quantity is upwards of 470,000 acres, which ſown with exportable corn, and yielding two quarters and a half *per* acre, at 22 *s.* is, - - -	1,292,500
Freight at 40 *s* a ton, - - -	391,600
	£. 1,684,100

This is a ſlight ſketch, but the reſult is of no little importance. We find that diminiſhing the number of our horſes only a third, and ſubſtituting oxen in their room, would not only make a prodigious plenty of butcher's meat; but bring above ſixteen hundred thouſand pounds a year, clear into the nation's pocket.

From all the reaſons that can be urged in any reſpect, to this point, of the difference between keeping horſes or oxen for the buſineſs of huſbandry, we have the greateſt reaſon to believe, that many very important benefits would reſult to the private occupier, and alſo to the public. 1. The farmer would cultivate his land cheaper. 2. His fields would be much cleaner, and in better heart. 3. The price of butchers meat would be reduced to the public. 4. An immenſe profit would likewiſe accrue to it in a prodigious increaſe of the exportation of corn.

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ARTICLE V.

Of the preference of Oxen for labouring on a Farm: De Re Ruſtica, *or The Repoſitory*, Vol. 1. Art. xxxiv.

THE author of *The Farmer's Letters* deſcants largely upon the conveniency of oxen, in rural work, above horſes, but acknowledges one article of expence that is ſaved in uſing horſes, which he ſays would be unfair to ſuppreſs; and that is, that a pair of oxen in a plough muſt have a boy to drive them, unneceſſary in a horſe plough.

He ſhews a good heart in every line, and great zeal for the good of the public. It would be a pity therefore to conceal from him what muſt give him great delight, which is, that oxen are not leſs tractable than horſes, and as eaſily taught to perform their work in a plough without a driver; and I take this method to let the fact be publickly known, as of ſome importance in huſbandry. For ſome time paſt, more than a year, I have employed an oxen plough without a driver in the moſt difficult parts of horſe-hoeing husbandry. And which is more, the oxen were trained, and eaſily trained, to go by the voice only, without ſo much as a rein to direct them. The following letter from a noted farmer, in the South of Scotland, tends to ſet this matter in a true light. After diſcuſſing ſome other articles, he proceeds thus,

"I have the pleaſure to inform you, that the oxen here work ſurpriſingly well. I uſe no yokes, but draw all in collars; and have ſhewn to demonſtration, that four oxen with collars, are equal at leaſt to ſix with yokes; beſides that they move much eaſier, and conſequently much faſter. A pair without a driver plow all my light land. A pair draw my carts and my harrows, and move equally quick with horſes. I propoſe to drill and hoe all my turnips with a ſingle ox. Four of them have broke up fifty acres of very good old lee full of whins and broom. In ſhort, horſes are attended with

with more expence than improvements in this corner will bear; and therefore I am reſolved to lay them aſide altogether, and to employ none but oxen for my beaſts of draught. Indeed, I cannot ſee the good of raiſing crops, and conſuming all upon the farm.

"The generality of mankind truſt more to authority than to reaſoning, and the authority of Eaſt-Lothian will be urged againſt me, where the ground is laboured with horſes only. But thoſe who cling to authority will pleaſe to be informed, that in Eaſt-Lothian, formerly oxen were employed in plowing, always indeed with a mixture of horſes; and as they are not made for carrying loads on their backs, the tenants, before the roads were repaired, had no way of carrying their *victual-rent* to a ſea-port, perhaps at eight or nine miles diſtance, but by horſe-loads. And horſes being neceſſary for that purpoſe, they thought it more convenient to uſe them for every operation of husbandry. But now, that the roads are repaired and every where acceſſible to wheel carriages, the moſt ſenſible farmers of Eaſt-Lothian are beginning to return to oxen, from a conviction that they are more convenient.

"The ſavings by the uſe of oxen in a farm are undoubtedly conſiderable; but the advantages of uſing oxen only are not confined to the farmer, but reach the ſubjects in general of every denomination. I ſhall mention but two articles. The firſt is, that the demand for oats will be much abridged; and conſequently a great quantity of land, upon which oats at preſent are raiſed, will be employed for wheat or barley. This will be beneficial to manufacturers, by lowering the price of living; and will be beneficial to the nation, by reſerving an additional quantity of grain for exportation. The other is, that the employing draught oxen, in place of draught horſes, will double or triple the number of the former; all of which, when they have ſerved their time in the plough, will be fatted and brought to market for food. This will increaſe the quantity of beef, and in proportion bring down its price,

price, greatly to the benefit of our manufacturers, and to our people in general.

———, Scotland,
January 1769. L. L. D."

ARTICLE VI.

Directions to the Farmer in his choice of a Farm, with reſpect to Soils——YOUNG's Farmer's Guide.

IN the common courſe of buſineſs, it is known ſome time before a farm is vacant; and thoſe who think of hiring it have more opportunities than one, of both viewing and enquiring after it. The great point is the ſoil. Let us, firſt, ſuppoſe it of a ſtiff nature, clay or ſtiff loam. A judgement of this muſt be formed according to ſeaſons.

Enquiries are commonly, and judiciouſly, made into the crops the land has uſually yielded; but let me remark, that this point, although not abſolutely to be ſlighted, yet is never to determine a man's deciſion. Crops are every where to depend on management, ſcarce ever on ſoil. A good farmer gains great crops where ever he goes; a bad farmer always poor ones. But as the rent is proportioned commonly to the ſoil, and as good huſbandry may be exerted on good as well as bad ones; it is requiſite to form an exact judgment of what every kind of ſoil is worth in rent.

And here let me remark, that, whenever I ſpeak of *rent*, I mean the amount of rent, commonly ſo called, repairs of buildings, covenants for work, ſtatute work for high ways, window-lights, &c. In a word, every article of annual expence, to which the farmer is liable from the occupation of his farm. If he conſiders the landlord's rent alone, he will, in numberleſs inſtances, be wretchedly deceived, and ſubject for ever to the worſt of miſtakes.

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All ſtiff ſoils are viewed to moſt advantage in winter: the general fault of them is wetneſs, which is in the greateſt exceſs at that ſeaſon of the year. If the fields are level, and the water ſtands in the lands notwithſtanding the furrows are well ploughed and open, it is a certain ſign that the clay is very ſtiff, and of ſo adheſive a nature as to contain the water like a diſh: It is likewiſe probable, that draining of every kind will prove inſufficient to cure the natural evil of ſuch land. This kind of ſoil, likewiſe, ſhews itſelf in the breaking up of ſtubble for a fallow; a very ſtrong draught of cattle is then neceſſary to work it. It breaks up in vaſt pieces, almoſt as hard as iron. When it is worked fine, it will run like mortar, with a heavy ſpring or ſummer ſhower. Theſe ſoils will yield very large crops of beans, and wheat, *&c.* They muſt, like others, be cultivated by ſome body; but I adviſe every friend of mine to have nothing to do with them; never to be captivated with ſeeing large crops upon the land; for he does not ſee, at the ſame time, the expences at which they are raiſed.

I do not, in mentioning this ſoil, any more than the reſt, notice the weeds they produce: I have never found that ſign worth a groat. For the different management of farmers, the purchaſe of ſeed, the charge of manures, *&c. &c.* all confound the natural connection between weeds and ſoil.

The next kind of ſtiff ſoil I ſhall mention is the mouldering, crumbling clay; which is, of all other ſoils, the beſt. If you obſerve a field of this land in winter, it will lie perfectly dry, if well ploughed and water furrowed.—You may walk over a winter fallow, or wheat field of it, ſoon after rain, without adhering to your ſhoes, and may eaſily puſh it about, like garden moulds, with the foot.—It will bear ploughing much earlier in ſpring, than any other ſtiff ſoil. If you view a ſtubble of it, you will find with a ſpade, that it will break looſe and mellow. Any drains take full effect on this ſoil, and will, if ever ſo wet, lay it perfectly dry: At the ſame

time, it does not run to mortar with ſudden rains. Whenever a Farmer meets with ſuch a ſoil as this, it is of no conſequence to enquire what crops it has yielded, or any ſuch circumſtances: He may depend on its bearing plenty of corn, with good management. If it has been defective, it muſt infallibly have been owing to a wrong method of culture.—— A flat ſituation is, to all ſtiff ſoils, unfavourable; a fall, or inclination ſome way or other, adds much to the value. Such a ſoil may exiſt unknown, for want of hollow draining; but then any little riſing place, that is dry, will, in all probability, prove an index to the reſt. Twenty ſhillings an acre for this land, when drained, is a much deeper rent, than 5 s. for the other clay.

The next ſoil I ſhall mention is that of the ſtiff loam, which is neareſt allied to brick earth; this is in general an unkindly ſoil, without plenty of manure. It is known in winter, by being very adheſive upon walking over it; is not ſo retentive of water as the firſt mentioned clay, being very eaſily drained; but is long in drying, even when little or no water is ſeen upon it: For which reaſon, it is generally late in the ſpring before it can be ploughed. When quite dry, it breaks up neither ſo hard and cloddy as the firſt clay, nor near ſo crumbly and mellow as the ſecond. If it is in ſtubble, it is apt to be covered with a minute green moſs. There are many varieties of this ſoil, but all agree in moſt of theſe circumſtances, and in being what the farmers call poor, cold, hungry land. When hollow ditched, and greatly manured, it yields any thing: but thoſe who hire it ſhould forget neither of theſe expences. It turns to the beſt profit laid down to graſs.

The gravelly ſoils are numerous in their kind, and very different in their natures. Warm, dry, ſound gravelly loams, are eaſily diſtinguiſhed in winter: They admit ploughing all winter through, except in very wet times; always break up quite in a crumbly ſtate of running moulds; and if a ſtubble, will dig, on trial by the ſpade, in the ſame manner. If under turnips,

turnips, you may perceive, by walking through them, that it will bear their being fed off. This ſoil will pay well for manuring, but will anſwer very well in a good courſe of management, without any.

The wet, cold, ſpringy gravel is a very bad ſoil; it is known, in winter, by the wetneſs of it; and in ſpring, by its binding with haſty ſhowers: It never breaks up in a crumbly ſtate, nor ſhews any mellowneſs under the ſpade. Hollow drains greatly correct its ill qualities, but it requires a prodigious quantity of manure to fertilize it.

Some gravels are ſo ſharp and burning, that they produce nothing except in wet ſummers; but ſuch are known at any ſeaſon of the year.

Sands are as various as gravels, and are all eaſily diſcoverable in their natures: The red black ſand is, I believe, as profitable a ſoil as any in the world: It has, at all ſeaſons, a dry ſoundneſs, and at the ſame time a moiſture without wetneſs, which ſecures crops even in dry ſummers. The ſpade is ſufficient to try it, at any ſeaſon of the year.

The light ſandy loam is, likewiſe, an admirable ſoil; it will bear ploughing, like the preceeding, all winter long, and appears quite ſound and mellow when tried with the ſpade. If it lies under a winter fallow, the beſt way to judge of its richneſs, is to remark the ſize of the furrows, and the degree of adheſion in the ſoil. In clay ſoils, the great excellency is the reſembling ſand in many circumſtances; and the ſandy ones, the ſimilarity of clay. Thus ſtiff land, being dry and crumbly, is a great perfection; and light land, being ſtiff and adheſive, is an equally good ſign.

When therefore the farmer views a light ſandy loam, whoſe ſound dryneſs is acknowledged, he may preſume the ſoil is *rich*, in proportion to its ſtiffneſs: If it falls flat in powder, and has no adheſion, it is much to be ſuſpected that it is a *mere ſand*. A dry ſound land, that is pretty ſtiff, is always good.——However, ſuch land being ſeldom without a crop

crop of turnips, the ſize of them (if they are not manured, which is very eaſily ſeen) will ſhew, in many caſes, the richneſs of the land.

The mere ſandy ſoil, that has ſcarce any adheſion, is alſo eaſily known: Upon this land it is of importance to view the crop, or crops. Dryneſs being the great characteriſtic of that ſoil, a wet ſeaſon ever proves the beſt of all manures; ſo if a poor crop is found upon ſuch land, in a wet year, there is a ſtrong preſumption that the ſoil is naught, at leaſt, in its preſent ſtate: And if the tenant is to be at the expence of marling, chalking, clay, or any other extraordinary manuring, the expence muſt be conſidered in the rent.

A general rule with all ſandy ſoils is, that, if dry, the ſtifſeſt is the beſt; except the black moiſt ſand, which exceeds them all.

The white chalky ſoil is, in general, of a cold, wet, ſpewy nature (as the farmers term it); will not bear ploughing in winter, unleſs the weather is very dry or froſty; runs exceſſively to mortar with a heavy ſhower, when in a pulveriſed ſtate. It is a cold hungry ſoil, of little profit, except with very peculiar management; and anſwers beſt, if tolerably dry, laid down to ſainfoine.

The moory ſoils, in a ſtate of cultivation, are too inconſiderable to mention particularly.

I am ſenſible there are a multitude of other ſorts of land ſeemingly diſtinct from theſe, which are here unnoticed; but it ſhould be remembered that the ſeveral kinds of land, like the ſhades of colours, blend into each other, till all diſtinction is loſt. Thus many ſoils are found partaking of both clay and loam, in ſo equal a manner, that it is difficult to aſſign it to either. We ſee the ſame thing between gravel and loam, chalk and clay, *&c. &c.*; and beſides theſe confuſions of diſtinction, each ſort of ſoil varies infinitely, and every quality in each ſoil the ſame. An attempt to characteriſe each variation, as well as each ſoil, would be an endleſs, and an impracticable

ticable work: I have, therefore, purpoſely paſſed by ſeveral variations of which I have even had particular experience, and ſtuck to the diſtinguiſhing marks alone. It muſt undoubtedly be left to the perſon who views a field, to determine which particular ſoil it is neareſt allied to; and what qualities, good or bad, are moſt to be diſcovered in it.

In reſpect to graſs lands, the marks for judgment are different. Theſe are beſt examined by attending, firſt, to the circumſtances in which they are moſt deficient; and then to ſuch as are in their favour. The more ſeaſons graſs fields are viewed in, the better; though any one is ſufficient for a tolerable judgment.

One evil attending theſe lands is, that of being too wet; the ſigns of which can never be miſtaken, or overlooked, in any ſeaſon of the year. In winter, it is at once perceived by walking on it; at all times of the year, by the herbage which generally abounds on it, ſuch as ruſhes, flags, and a great quantity of moſs; and alſo by the colour of the graſs, which is moſtly blue at the points; ſometimes of a dirty yellow hue, and always coarſe. If the ſoil is the firſt deſcribed ſtiff clay, and the ſurface level, the evil will be very difficult of cure; if of the other ſort of clay or ſtiff loams, draining will have great effects. To diſcover the ſoil, the ditches ſhould be examined; and if tried here and there with a ſpade, it will be the better.

Another evil, to which graſs fields on theſe ſoils are liable, is that of being hide-bound and moſſy, without any exceſs of wet; this is very preceptible in winter, and when fed. If a tenant is not allowed to plough ſuch, they will require a great expence in manure.

Graſs fields on gravelly ſoils are, if the gravel is ſharp, very apt to burn (as the farmers call it), in dry ſummers; it is a fault, in ſuch years; but they give great and ſweet crops, in wet ones, provided it is a gravelly loam. An *abſolute* gravel

ſhould

ſhould never be under graſs. A farmer ſhould not, however, regret having a paſture or two of this ſort in his farm, being of excellent uſe in winter, for feeding ſheep and lambs on with turnips, *&c.*

The low meadows, whatever the ſoil, on the banks of rivers and brooks, are in general very good, but often ſubject to the terrible misfortune of being overflown in ſummer; which not only ruins crops of hay before they are cut, but carries them away perhaps when juſt made. This is a miſchief which leſſens the value of ſuch lands greatly, and ſhould always be enquired into. Winter floods, if not too frequent, are beneficial.

Some farms have the reputation of always rotting ſheep, if they are ſituated very low, and have much wet graſs land. The report may be very juſt; but, I believe, it will generally be found that this quality is but an attendant of others already noted; and that the cure of common wetneſs, by thorough draining, will at the ſame time remedy this evil.

Many graſs fields, on all ſoils, conſiſt of ſo bad an herbage as to be of little value.—Made up of all ſorts of weed trumpery, and the worſt and coarſeſt of graſſes; if a landlord will not allow ſuch to be ploughed, the farmer ſhould minute the rent accordingly. This fault is viſible at all ſeaſons.

As to a general poverty of ſoil, of whatever ſort, owing to bad management, ſuch as perpetual mowing — no manuring — or a general inattention; the degree of ſuch a ſtate will always be evident, whether viewed in winter, ſpring, or ſummer, under hay or fed; but the favourableneſs, or unfavourableneſs of the ſeaſon, ſhould not be forgot in ſuch a view.

The *viſible* excellencies of graſs lands are recited in a few words. A good crop of graſs in a wet ſummer is not to be relied on; but if it happens to be a dry one, the ſign is by no means to be rejected.

The goodneſs of the herbage is to be ſeen at all ſeaſons, even in winter.

Lying

Lying dry and ſound, holding a good verdure, and blotched with patches of yet deeper green; theſe are, in winter, undeceiving proofs of excellent paſture. If ſituated on a hill, or any ſpot that gives ſuſpicion of burning, try it with a ſpade.

A river that does not overflow, running through a farm, is a very favourable circumſtance, as it indicates a great probability of all the graſs fields being well watered; that is, for cattle. Paſtures, that have neither a river nor ponds in them, are of little worth; the inconveniencies of truſting cattle in ſuch, are too great to be ſuffered.

There are, in many farms, very refuſe waſte paſtures, never mown; over run with mole and ant-hills, buſhes, brambles, &c. for which very little rent is demanded. Such are by no means to be ranked in the tenant's chapter of evils; for no farm would be more profitable than one conſiſting wholly of ſuch. The hills cut up, and mixed with a little lime, dung, aſhes, chalk, or marle, make an admirable compoſt. The buſhes and brambles are eaſily grubbed up, and will pay for the work. Then the fields ſhould be examined. If a light gravelly or ſandy ſoil, they will pay very well under the plough; and if a clay or loam, manure them well, which will diſcover what the herbage is. If good, leave them in graſs; if bad, convert them into tillage for a few years, under an engagement (if required) to lay them well down again. Such old and forſaken graſs fields are to be reckoned among the moſt profitable paſtures. But the rent ſhould not be above 10 s. an acre.

ARTI-

ARTICLE VII.

A Letter to the EDINBURGH SOCIETY, *concerning the method of managing* Outfield Ground: *By a Farmer.* 1763.

GENTLEMEN,

I HAVE obſerved, with much ſatisfaction, the proceedings of the EDINBURGH SOCIETY for the improvement of our country; it is the duty of every individual to contribute his endeavours for promoting an undertaking ſo national and ſo praiſe-worthy. With this view it is, that I beg leave to communicate to the SOCIETY ſome obſervations on Agriculture, which are the reſult of experience, and which ſeem of no inconſiderable moment to Scotland.

My purpoſe is to point out a general and moſt fatal error in the ſyſtem of Agriculture, which prevails in Scotland among the common Farmers, and to ſuggeſt a plain method for correcting this error without any new expence whatever: what I ſhall obſerve particularly reſpects the county of Air, in which my reſidence is; but it will, I am afraid, be too applicable to many other counties in Scotland

The county of Air contains forty-five pariſhes; of theſe pariſhes there may be fifteen, which, of late years, have been principally appropriated to the raiſing of cattle, and kept moſtly in graſs, ſo that they do not properly fall under the alterations propoſed, and will not be counted upon in this ſcheme.

In each of the remaining thirty pariſhes there are, on an average, 1000 acres of Outfield land; I mean ground that has never been manured or otherways improved; and has, for ages paſt, been ploughed and cropt with oats for three years, then ſuffered to reſt for three years, and then ploughed and cropt again in the ſame courſe, in a perpetual rotation; ſo that 500 acres of that Outfield land in each pariſh is yearly under tillage.

Under

Under the denomination of Outfield, I do not comprehend *Flooded-ground* or ground lying contiguous to meadows, or on ſides of burns and rivers, commonly termed *Holming-ground*, which, by reaſon of its natural fertility, conſiſting of loam, may, without very great detriment, endure an imperfect and ill judged culture; neither do I comprehend, under the denomination of Outfield ground, thoſe grounds, which, by means of their ſituation, accidentally receive manure from the ſoil waſhed down by land-floods from the heights. There will therefore fall under conſideration (after leaving out the fifteen pariſhes before mentioned) of Outfield ground, in the county of Air, no leſs than 30,000 acres.

I propoſe *firſt* to ſhow, that a Farmer in Airſhire is indeed a loſer by ploughing this Outfield ground, according to the method, univerſally practiſed; or, in other words, that the crops, reaped from ſuch grounds, are not ſufficient to pay ſeed, labour and rent.

To thoſe who reſide in more fertile countries, or where better methods of cultivation are eſtabliſhed, this aſſertion may ſeem ſtrange; but it muſt be obſerved, that, in the county of Air, the yearly produce from a Scots acre of Outfield (one year with another) will not, at an average, exceed ſixteen Wincheſter buſhels (or two Engliſh quarters) of Oats.

Let me then enquire what thoſe ſixteen buſhels of oats coſt the Farmer.

To each Scots acre there muſt be allowed, for ſeed, ſix Wincheſter buſhels (or twelve of our pecks); this brings down the yearly produce to ten buſhels: ſome Farmers indeed ſow leſs, eſpecially in the firſt and third year's ploughing, but then the produce is proportionally ſmaller.

The ploughing and harrowing each acre cannot be accounted at leſs than ſix buſhels, or eight ſhillings Sterling.

The value of the ſtraw, produced from a multitude of ſmall ſheaves of very ſhort and weak corn, will not be found to exceed the expence of gathering, binding, and threſhing; and the value

of the Oats, or Out-dightings, will not defray the carriage to mill and market of what comes to be diſpoſed of in that way.

Thus, out of two quarters, only four buſhels, or eight pecks, remain, and this will be found to be more than exhauſted by the expence of ſhearing, and by the rent payable to the maſter; ſo that, in this view of things, the Farmer gains nothing by this Outfield ground; on the contrary, as it muſt be remembered, that the graſs of all the Outfield ground, under tillage, by this method of culture, is loſt; and, as each acre of that graſs, taking the whole promiſcuouſly together, cannot be valued at leſs than two ſhillings ſterl. an acre, the annual loſs on 15,000 acres is no leſs than 1500 l. ſter.

I ſhall now, in the ſecond place, ſhow that this Outfield ground might, by the Tenants that poſſeſs them, and with the ſame ſtock they have, be ſo improved, in the courſe of a few years, as to produce a very conſiderable increaſe of grain to the country.

It muſt be allowed, that every Tenant poſſeſſed of a plough gang of land, that is, one who has work for four horſes, ploughs, and ſown twenty acres yearly of this Outfield ground: whether this proportion be juſt or not in the diviſion of the whole Outfield ground in the county is not material to the preſent diſquiſition.

Inſtead of ploughing twenty acres, I would adviſe him to plough no more than five acres; let his ſavings under this article be conſidered:

To 8 s. ſterling for each of the 15 acres, plough ed leſs than uſual, being the expence of plough- ing and harrowing, is, - - -	6	0	0
To ſix buſhels of oats, (or twelve pecks) the ſeed he was to have ſown on each acre of the 15 acres, at 8 d. per peck, - - -	6	0	0
To 15 acres of graſs, at 2 s. ſterl. per acre that his paſture has increeſed, by his ploughing only five acres, - - - -	1	10	0
To the expence of reaping 15 acres, at 2 s. 6 d.	1	17	6
Total ſo ſaved,	15	7	6

N. B. There is no great difference betwixt the reaping one acre of this thin corn (which is very troubleſome to gather in) and an acre of cropt corn, yet I have made the calculation one fourth leſs.

It may be objected, that a Farmer, who has ſervants and horſes, ſaves nothing by not employing them; ſo that, if he has the means of ploughing twenty acres, he ſaves nothing under thoſe articles by ploughing no more than five acres.

It is anſwered, that, if he could plough and harrow fifteen acres more than he has to do in his own farm, he will be able to work to others, to that extent; or, ſhould he not be employed that way, I would not confine horſes and ſervants to that ſingle part of Huſbandry, but recommend any work that may procure them an equal or greater return; and it will be found, on examination, that there is ſcarcely one Tenant in Scotland, who may not employ his ſervants and horſes, with evident advantage, either in his own work, or in aſſiſting his neighbours or maſter.

Thus then the Farmer has a ſaving of 15 l. 7 s. 6 d. on the fifteen acres which he has left untilled.

This will purchaſe and lay down upon the five acres of Outfield ground, to be ploughed in 1763, 1845 buſhels of lime, at 2 d. per buſhel, or 8 d. per boll, that is, to the amount of 368 buſhels, or 92 bolls, per acre.

If the lime be got for 1 $\frac{1}{2}$ d. the buſhel, which will be the caſe in moſt of our high grounds, the ſum above will purchaſe 2460 buſhels of lime, which is 615 buſhels, or 123 bolls for each acre of the five acres.

From the five acres, thus limed, a crop may be expected, in the year 1763, of 40 buſhels each acre, which makes, for the five acres, 25 quarters or ſhire of Air bolls, out of which deduce 10 quarters for ſeed, to be ſown the next year, remains 15 quarters to the Tenant: this, at the converſion of 10 s. 8 d. per quarter, is 8 l. ſterling.

It

It may be objected, that this calculation is high for the firſt crop of limed ground; but as, in the following years, the produce will be calculated no higher, it is thought it will be found a reaſonable medium for the crops of three years.

It is propoſed, that, in the year 1764, the Farmer ſhall plough the five acres already mentioned, and five acres more of the twenty, for which he has the following funds:

To profit of the 5 acres, crop 1763, - -	l. 8	0	0
To graſs of 10 acres remaining unplow'd, -	1	0	0
To ſaved by not plowing theſe 10 acres, - -	4	0	0
To ſaved by not cutting down 10 acres, -	1	5	0
Saved,	14	5	0

This ſum will purchaſe, and lay down on the ſecond five acres, 1710 buſhels of lime, at 2 d. per buſhel, which is 342 buſhels the acre, or, if bought at 1 ½ per buſhel, this ſum will purchaſe 2280 buſhels, which is 456 buſhels to be laid on each acre.

N. B. It is to be conſidered, that the Farmer is to take the beſt of his Outfield ground under this new management the firſt two years, ſo as the produce may be as large as he can make it, while the funds are at the ſmalleſt, which, as will be ſeen by what follows, is the caſe for the firſt and ſecond year of this improvement.

It is propoſed, that, in the year 1765, the Farmer ſhall plough the ten acres already mentioned, and five acres more of the twenty: for this he has the following funds:

To the produce of the ten acres, at five Airſhire bolls, or five Engliſh quarters, the acre, after leaving in the Farmer's hands 15 bolls for his ſeed, there remains 35 bolls, at 10 s. 8 d. per boll,	l. 18	13	4
To the graſs of 5 acres ſtill unplow'd - -	0	10	0
To ſaved by not plowing theſe 5 acres, - -	2	0	0
To ſaved by not being obliged to reap theſe five acres, - - - - - -	0	12	6
Saved,	21	15	10

This

This ſum will buy, and lay down upon the ground 400 buſhels of lime for each acre of the five that is to be limed this year, being 3 l. 6 s. 8 d. ſterling, at 2 d. per buſhel, or 16 l. 13 s. 4 d. ſterling for the whole of the five acres, and there will afterwards remain in the Tenant's hands 5 l. 2 s. 6 d. ſterling, which ſhould be employed in buying graſs-ſeeds and a little dung, or other manure, for the pooreſt parts of the firſt five acres limed, which ſhould be laid down into graſs this year; and it may be left to the Farmer to make what part he pleaſes a barley or oat crop, as either does well in laying down ground with graſs-ſeeds; and, ſhould any part appear to fail, a little ſuperficial manure, which, before this time, can be ſpared by the increaſe of ſtraw from the new improvements, will bring the pooreſt parts of theſe five acres equal with the reſt.

The laſt five of the twenty acres come now to be taken in hand, and the farmer has for improvement, the produce of fifteen acres, at five bolls the acre, which is 75 bolls, out of which deduce, for the next year's ſeed, 15 bolls, there remains 60 bolls at 10 s. 8 d. per boll, is, l. 32 0 0

To this muſt be added 40 s. ſterling, ſaved to the Farmer in work, by his not ploughing the firſt five acres, which is cut in hay, - 2 0 0

Saved 34 0 0

Out of this is to be deducted 50 s. ſterling for each acre of the ſecond five acres brought under improvement, ſo as the Farmer may be able to give it ſome new manure, and lay it down with graſs ſeed, - - - 12 10 0

Saved by the Tenant at the end of the crop 1766, 21 10 0

This ſum of 21 l. 10 s. with the produce of the firſt five acres, that was ſown with graſs ſeeds laſt year, and may be ſuppoſed to yield 30 s, ſterling per acre, as hay, is, - - 7 10 0

29 0 0

The

The increaſe of ſtraw that muſt ariſe from the crop of the new improven ground will anſwer the expence of cutting down and threſhing, and foggage of the hay field will pay for cutting and making of the hay.

In this year 1767, the Farmer is to begin with his other twenty acres of Outfield land, which, for theſe four years, muſt have been lying in graſs, ſo that his paſture has been no ways decreaſed, and thoſe remaining twenty acres muſt be as fit or fitter for improvement than ever he had them.

The ballance in the Farmer's hands, crop 1766, is, - - - - - l.	29	0	0
Deduce for ſeed, for ten acres of the firſt twenty acres ſtill in grain, ten bolls, at 10 s. 8 d.	5	6	8
	23	13	4
Alſo to be deduced five bolls for ſeed for the firſt five acres of the ſecond twenty, at 10 s. 8 d.	2	13	4
	21	0	0
Alſo deduce 2 s. per acre for the graſs of the five acres, that the Tenant was ſhort in his paſture, by his old method, - -	0	10	0
	20	10	0

This 20 l. 10 s. ſterling will buy 2460 buſhels of lime, or 615 bolls, which being laid out on the firſt five acres of the ſecond twenty acres, it will produce, as before, five bolls the acre, which comes to 25 bolls,

The ten acres of the firſt twenty being ſtill in grain, is 50 bolls,			
In all 75 bolls, at 10 s. 8 d.	40	0	0
The hay of the firſt and ſecond laid down five acres, is ten acres, at 30 s. ſterling the acre,	15	0	0
	55	0	0
To be deduced for graſs ſeeds for the third five acres of the firſt twenty acres, at 20 s. per acre,	5	0	0
Of crop 1767 there remains in the Tenant's hands, - - -	50	0	0

In

In the year 1768, the Tenant is to continue and greatly increaſe his improvement, by limeing ten acres more of the ſecond twenty acres, as he has in his hands 50 l. ſter. out of which deduce ten bolls for ſeed for theſe ten acres, and five bolls for ſeed for the laſt five acres of the firſt twenty acres; alſo five bolls for the firſt five acres of the ſecond twenty, all to be ploughed this year, in all twenty bolls, 10 l. 13 s. 4 d. Remains - - - 39 6 8

Deduce for graſs ſeeds, for laying down the laſt five acres of the firſt twenty acres this year - 5 0 0

Remains 34 6 8

And, as an allowance for the Tenant's wanting fifteen acres of paſture, according to the old method, he is allowed to paſture the firſt five acres laid down with graſs ſeeds.

The foreſaid 34 l. 6 s. 8 d. ſterling will buy 4120 buſhels of lime, or 1030 bolls, to be laid on the ten acres to be improved this year, at the rate of 103 bolls per acre; and the produce of twenty acres of grain this year, at five bolls the acre is 100 bolls, which, at 10 s. 8 d. per boll, is, - - - - - l. 53 6 8

To which add the produce of the ſecond and third five acres of hay, - - 15 0 0

There will remain in the Tenant's hand, for crop 1768 - - 68 6 8

This ſum will enable the Tenant, in the crop 1769, not only to take in the remaining five acres of the forty, but to enrich any parts of the whole acres of the forty that he ſees may need it, and the increaſe of his manure will be a great addition to the keeping of theſe lands in good order, and he will have it in his power either to incloſe and divide theſe lands into incloſures, or pay his maſter for ſo doing; and when the lands are ſo improved, if the Tenant will only plough one third yearly, ſo as two thirds may be always in graſs

graſs, and never broke up and ploughed, without being ſix years in graſs, it will not be in his power to hurt the improvements made: on the contrary, the lands will grow richer, though they receive no new manure; but, as he will ſoon ſee the advantage of making them richer, and being able to do it, there is no doubt, but that he will put them into the beſt order in his power; and, at the moſt moderate calculation, we may ſuppoſe always one third of the lands ſo improved may be ploughed yearly, and will produce at leaſt five Engliſh quarters each acre; ſo that, if all the Farmers in the county were to follow this plan propoſed, in the year 1768, the whole Outfield land would be improven, which is at leaſt 30,000 acres of land, one third of which being 10,000 acres muſt produce 50,000 bolls of victual yearly, that the Tenants can carry to market more than they did before, which, at 10 s. 8 d. ſter. amounts to l. 26,666 13 4

Beſides, there is 20,000 acres of ſown graſs in the County, more than ever was before, which, at a reaſonable value, may be valued at 5 s. ſterling each acre; and deducing 2 s. per acre, the old price of the Outfield land graſs for the 15,000 acres, that lay in graſs yearly, there remains 3500 0 0

Which makes an additional income to the County, the year 1769, of - l. 30,166 13 4

If any thing fall ſhort of the plan and calculation, it will be the produce of the firſt ten acres improved, when the lands may be poor in their nature, and when the funds are ſmalleſt: but when a maſter is ſatisfied with the uprightneſs of his tenant's deſigns, he will ſurely not ſcruple to advance him a little money, for two or three years, eſpecially as he has next to a certainty of his being repaid, and the lands made better.

The improvements will likewiſe anſwer to better purpoſe, if the lands be incloſed and divided; this alſo the maſter ſhould encourage

encourage and promote as early as he can, and not take too high intereſt for what he lays out.

If this improvement of the country took many years to make it effectual, I ſhould deſpair of the execution; but, as the ſcheme is plain, and may be underſtood by the meaneſt capacity, and the whole may be executed in the ſpace of ſix or ſeven years; and, as much depends on the landlords to prevent the tenants from going on in their erroneous method, and to encourage them in carrying on the new plan (if it is approved of by men of judgment and ſkill in Agriculture) we may ſoon hope to ſee it brought into execution.

I could point out many other advantages that would attend this reformation in the labouring of land, but will only ſuggeſt one thing, that, from experience, I know might be made effectual, and keep a very conſiderable ſum in the country, that annually goes out of it.

What I mean is this; as the Weſt of Scotland yearly brings from England, Ireland, and other places, great quantities of cheeſe and butter, the increaſe of paſture by ſown graſs would infallibly augment the produce of thoſe two articles.

It would ſurpriſe the ſociety to know, to what extent thoſe commodities are brought in upon us: nothing is wanting to ſtop it, but to raiſe abundance of graſs for milk cows. What has been formerly propoſed will lead the tenants effectually into ſuch methods; and, by recent experience, we find, that we can make butter and cheeſe as good in Scotland as any where, ſo that nothing but our negligence hurts us.

If what has been ſuggeſted in this letter may prove uſeful to my country, it will give great pleaſure to one who is moſt heartily an improver, and who thinks himſelf honoured in bearing the name of

Airſhire, A FARMER.
January, 1763.

ARTICLE VIII.

Of curing rank coarſe Meadows, and cultivating Cabbages as Food for Cattle: In a letter from a Clergyman.

Muſeum Ruſticum. Vol. I. Num. VI.

EVER happy in obeying your commands, I ſhall forthwith inform you what methods I purſued to make the meadow at the back of my houſe ſo good as it is. You well remember, that, when you thought me worthy of ſupplying the place of the late incumbent of this rectory, this meadow was wet, poachy, over-run with ruſhes and flags, and the little graſs that grew on it was coarſe and rank.

I at firſt ignorantly enough imagined it was owing to ſome deficiency in the ſoil; yet being ſomewhat doubtful, in the middle of the ſummer, when the ſeaſon was dry, I cauſed a deep trench to be dug in the meadow, and, on examining the ſoil, found the labourers threw out a rich black earth, and that it had a ſufficient depth.

This encouraged me to proceed. I immediately had deep drains cut all over the land at proper diſtances, to carry off the ſuperfluous water: my next work was, to cauſe all the ruſhes and flags to be mowed as cloſe as poſſible to the ground, and the whole meadow covered with coal-aſhes.

This had not the deſired effect; for the ſucceeding ſpring, the meadow was again almoſt covered with flags and ruſhes. I was now determined to plow it, which I did the latter end of the ſummer. Still thinking that the earth was not ſtirred to a ſufficient depth, I hired ſeveral ſtout labourers, and agreed with them to dig it for me, two ſpit deep at leaſt, for threepence a rood: they did me juſtice in their work; for when it was finiſhed, the whole had the appearance of a clean well-kept garden. This digging was performed early in the ſpring, after the froſts were gone off.

Being

Being unwilling to let land, on which I had laid out ſo much money, lie idle, I cauſed the whole of it to be planted with the largeſt kind of cabbages*. I allowed each of the plants a ſpace of four feet to extend its roots.

At firſt the plants ſeemed ſcattered, and at a great diſtance from each other; but they ſoon began to thrive apace. I took great care that the intervals were kept quite clear of weeds by frequent hoeing; and twice in the ſummer I cauſed them to be ſtirred with the ſpade: this had a ſurpriſing effect, and the plants grew to a wonderful ſize and weight, the land ſeeming entirely covered by them.

When my crop of cabbages was come to perfection, I cauſed ſome of them to be boiled for my family uſe, and with great ſatisfaction found they were much ſweeter than any I ever had from my kitchen-garden: this I attributed, and perhaps not without reaſon, to the land not being dunged.

Being at a loſs what to do with my crop, which was not ſaleable in my neighbourhood, I came to a reſolution of giving them to my cows, which fed on them plentifully, and greatly encreaſed in the quantity of milk they gave; but the milk had a diſagreeable taſte, as well as the butter which was made from the cream of it; but for this I ſoon found a remedy by uſing Hale's method of ventilating it.

I afterwards, with ſome of theſe ſame cabbages, brought four large hogs ſo forward in fleſh, that ſix buſhels of barley meal made them all completely fat and fit for the pickling-tub; and they turned out moſt excellent pork, without any bye-taſte; I muſt however notice, that I was at firſt obliged to cauſe the cabbages to be boiled for the hogs, to induce them to eat hearty; but they were ſoon by degrees brought to reliſh them raw.

My poultry were extremely fond, both of boiled and raw cabbages; and my draught-horſes, when it was cut ſmall reliſhed it

* Carrots may alſo with great advantage be cultivated in the fields, and are extraordinary good food for horſes, cows, oxen, ſheep, hogs, or poultry, which thrive on them amazingly.

it much when mixed with oats, and ſeemed rather to thrive from the change of food; they alſo eat much leſs hay than uſual.

I was not at all diſpleaſed with my experiment, and have every year ſince cauſed a piece of meadow to be dug and planted with cabbages for the above purpoſe.

In the ſpring, I cauſed all the ſtalks to be pulled up, and the land ſtrewed over with the ſweepings of my loft, and the bottoms of my hay ſtacks, adding ſome ſeed of the ſweet white-flowered, or honey-ſuckle trefoil *; I then ordered my workmen to fill up the drains with witch-elm faggots: over them were laid ſome large ſtones, and the whole covered with looſe earth, ſown with hay ſeed like the reſt of the meadows: by this means I loſt no ground, and the whole field took the appearance it had when you ſaw it, and bears as good crops of as ſweet hay as any in the pariſh.

It is now five years ſince I laid it down again in graſs, and there has not in that time been the leaſt appearance of either ruſh or flag. By the experiment I have related to you I gained two pieces of knowledge; I firſt diſcovered new uſes for cabbages, and laſtly, hit on a method of meliorating and cutting a rank meadow.

As to uſing cabbages for feeding cattle, &c. it may not perhaps be looked upon as any very valuable acquiſition in huſbandry, though I have found advantage from it; yet the curing rank meadows is certainly worthy our attention, as there are in England many thouſand acres of coarſe meadow land let under five ſhillings per annum each, which, prepared in the manner I have deſcribed, would be worth at leaſt forty ſhillings an acre, perhaps twice as much, if near a great town or city.

ARTI-

* Mr Miller with very good reaſon, greatly recommends the honey-ſuckle trefoil to our notice, as worthy of being particularly cultivated: he obſerves, that it is common in moſt of our paſtures; but no body has thought it worth while to ſave its ſeed. In the Netherlands the peaſants have induſtriouſly gathered it, and now ſow a great number of acres annually ſolely with a view of ſupplying the Engliſh markets with it. This is no inconſiderable object, for, when there is a good crop, and ſaved from the ſpring growth, the ſeed produced from one acre will be worth twelve pounds.

ARTICLE. IX.

Of the great benefit of Salt Marſhes, for Horſes, and Cattle; and of ſubſtituting Salt itſelf, in their ſtead.

Muſæum Ruſticum. Vol. I. Num. XIX.

IT has been obſerved, that horſes and black cattle, thrive better, and get fleſh and fat ſooner, in ſalt marſhes, than in freſh-water meadows or upland paſtures; yet I do not remember, ever to have heard any good reaſon aſſigned for it.

Some will tell you that the air of the ſea whets their appetites; that the paſture is rich and nouriſhing; and that the herbs produced by the lands near the ſea are more conducive to the health of herbaceous animals, than ſuch as grow on upland paſtures, whether natural or artificial.

But may we not rather attribute the thriving of cattle on theſe marſhes, to the ſaline particles * with which the earth, as well as its produce, is, when near the ſea, ſtrongly impregnated? Perhaps even the dews have their portion of ſalt; but of this I have made no experiment, therefore mention it only as a probable conjecture; for as they fall ſoon after they are exhaled from the ſea, without paſſing through the ſecretions neceſſary to ſeparate their ſaline parts, why ſhould not this be the caſe?

But to return to my firſt ſubject: I am fully of opinion, that the ſaline particles only, with which the graſs is impregnated in the above mentioned marſhes, cauſe cattle to thrive in them in the manner they are known to do. Theſe ſalts purge away the foul humours which the beaſts have contracted, either by idleneſs, or by being over-heated in labour; by which means they are better diſpoſed to be nouriſhed by the aliment they receive.

It

* Perhaps the thriving condition of cattle on ſalt-marſhes may be owing to the ſalts making them drowthy; for it is an obſervation of graziers, that when cattle drink plentifully they thrive apace.

It may, perhaps, be objected, that if the graſs of theſe marſhes is apt to purge cattle, this very purging, by being long continued, will be a means of preventing their growing fat. To this I anſwer, that the cattle take with their food every day nearly the ſame quantity of theſe purgative particles; but that the quantity of ſalt, which at their being firſt put into the marſh will have that effect, will ceaſe producing it when they are, by cuſtom, habituated to take a daily portion of it: this muſt be allowed, as we all know that a few grains of rhubarb will operate as a cathartic to a perſon that is not accuſtomed to take it; yet it is as well known, that a man may take many grains daily, if he uſes himſelf to it, without its being ſenſibly purgative to him.

It is not convenient to every one to ſend their cattle to a ſalt marſh: would it not, therefore, be happy, if we could ſubſtitute a method that would nearly anſwer the ſame purpoſe? I do not think this impoſſible: perhaps, if common ſea-ſalt * was to be laid in the fields for the horſes to lick as often as they pleaſed, they would thrive much better: Were I to ſay I know it would have that effect, it would be no preſumption.

Cattle are naturally fond of ſalt, and if left at their liberty, will take no more of it than what does them good. With this help, our freſh water meadows, and upland natural and artificial paſtures, would yield us a greater profit, and of courſe be worth more both to the land-owner and farmer.

Some will not allow a thing to have merit, unleſs it is ſupported by what they call a proper authority; and they do not allow the experiments of a particular perſon to be ſufficient. To ſatisfy ſuch I can aſſure you, that in the inland parts of Switzerland

*This method of laying ſalt in the way of cattle may be, perhaps, to advantage practiſed; it carries with it an appearance of reaſon: we would therefore recommend it to the lovers of nature and agriculture, to make repeated and diligent experiments, and let us know the reſult of their obſervations.

Switzerland, when their horſes and cattle have endured the hardſhips of a long and ſevere winter, they turn them in ſpring looſe into the mountains, laying ſalt here and there upon the rocks, for them to reſort to when they pleaſe; and of this they are ſo fond, that when the farmers want to catch their horſes, they take ſome ſalt in their hats, as we do oats in a ſieve, to allure them.

Experience has long convinced them, that the ſalt thus laid in their way anſwers every good purpoſe: Their cattle are more healthy in general than ours are in England; and almoſt to this alone do they attribute it.

In the provinces of Munſter and Connaught, in Ireland, they very frequently lay ſalt on ſlates, for the benefit of their horſes when at graſs; This, they find, does the cattle great ſervice; and in this we ſhould imitate them, and not be too proud to learn of them, becauſe in Ireland agriculture is not in ſo flouriſhing a ſtate as in England.

Some few farmers have (to do them juſtice) practiſed this method in our own country; but contenting themſelves with the profit reſulting from it, they have not propagated the knowledge of the many advantages they are ſenſible may be derived from this practice, of giving ſalt to cattle.

The farriers and horſe-jockeys know well the uſe of ſalt; they mix it often in their medicines, and find, by experience, that nothing proves ſo powerful a ſtomachic to horſes, as a little ſalt thrown into their oats.

If the hints I have given are of ſervice, it will give me great pleaſure: but I muſt farther obſerve, that the uſe of ſalt is very proper when cattle are turned into clover, lucerne, or cole-ſeed, to feed: it is well known, that, on theſe occaſions, they are very apt, unleſs great care is taken, to be ſurfeited; the ſalt would prevent this accident, and thereby greatly accelerate the fattening of the cattle, and make it much ſafer to the farmer.

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ARTICLE X.

Wall-Flower propoſed to be tried as a Winter-feed for ſheep.
In a letter to the PUBLISHER.

A proper proviſion of winter food for cattle and ſheep is now very juſtly conſidered as one of the moſt important objects of a farmer's concern. The culture of turnips is, in many parts of Scotland, already well known; and, it is to be hoped, will every day become more general, for the ſake of both cattle and ſheep. Horſes are by ſome farmers already ſucceſsfully fed by patatoes, which every farmer ſows in ſome proportion, but ſhould be extended to a greater degree; and cabbages are creeping in; though, as yet, but little cultivated by actual farmers; few of whom have yet attempted them, ſo far as I have had opportunity to obſerve, probably owing to their ignorance of the method of cultivating them. Some of my neighbours have expreſſed their willingneſs to try them, if they had proper directions: And we all expect from your collection to get proper directions, not only for them, but likewiſe the beſt methods of raiſing turnips and potatoes.

I am induced to write you, in conſequence of your invitation to farmers, to be your correſpondents, both for communicating our own obſervations, and for aſking advice when we need it: And to mention a thing that is worthy being tried as a winter feed for ſheep, though it has never been noticed, ſo far as ever I heard, but on the occaſion I am going to inform your readers of.

I was informed by a gentleman's gardener, a very ſenſible intelligent man, that a parcel of ſheep having, in the time of a ſevere ſtorm of ſnow, broke into his garden, they went through the greateſt part of the garden, paſſing by his plots of cabbages, kail, and other things, which it was moſt likely would attract them, without harming them, but in a ſmall degree; till

till they came to a flower border, in which was a good many plants of different kinds of Stock Gilly-flowers: these they fell upon, and eat them down to the ground. Now, as the Stock Gilly-flower is a ſpecies of the Wall-flower, and is a perennial plant, pretty hardy, ſo as to ſtand during the winter, and may be very eaſily propagated, the thing is worth a fair experiment; and ſome of the Gentlemen Farmers, who you obſerve are the proper perſons to make experiments, ſhould certainly be at ſome pains to diſcover, whether this plant may not prove a good feed for ſheep, and thereby encreaſe the ſtore of winter feeding for them.

I ſhall not take up more of your time at preſent, but to wiſh all ſucceſs to your project, which is very agreable to all our neighbourhood, and is expected will prove of great benefit to Agriculture. Moſt of us have engaged to take your book, and when we can find any thing worth communicating, have engaged to do it; to which you may give a place in it, as you find it deſerves; and I leave this letter to your diſcretion. I am, Gentlemen,

your friend and Wellwiſher.

Lanarkſhire, M.
November 1772.

ARTICLE XI.

Of the Conditions of Tacks—Making Fences—How to prevent the Livercrook in Calves—The marks of a good Bull:

In a letter to the PUBLISHERS.

AS you desire Farmers to be your correspondents, although illiterate, and promise to dress their writings in a better stile, this encourages me to send you my thoughts on the following subjects; which, but for your promise, I never would have thought of; as it takes a great deal more learning to be a writer than a Farmer.

As the benefit of inclosing is universally acknowledged both on the part of the landlord and the tenant, a due regard should always be had to it in settling the terms of a lease. And I think, with respect to this article, a tenant, to enable him to inclose his farm, if proper for inclosing, should have a lease of three nineteen or fifty-seven years, and the half of the expence of the fences repaid by the landlord; or two nineteen or thirty-eight years, and two thirds of the expence of the fences paid by the landlord; or twenty-five years, and the whole expence: And so, by giving the tenant the expence of the fences or part of it, he is induced to put and keep them in good order; and the landlord would be a great profiter by having the grounds ready inclosed and fencible at the end of the lease.

The restrictions in leases should be very few, and these only to take effect, within a few years of the end of the lease; such as leaving a certain quantity of ground in grass, and a certain quantity in fallow; sowing only a certain quantity of wheat, and that only after fallowing and dunging; taking only a few crops after liming, and the like: For, as on the one hand, it may often prove a very considerable loss to the tenant not to have liberty to turn his ground to any purpose that may prove most advantageous to him, during his lease; so, on the other hand,

hand, it is equally unjuſt that a tenant ſhould have liberty, at the end of his leaſe, to undo all the improvements he has made during the currency of it. When a tenant is to enter upon a Farm, that has undergone this misfortune, a conſideration ſhould be had of it in the rent, and he ought to have ſome deduction for the firſt four or five years of the leaſe; as a tenant often loſes ſo much on a farm thus run out, as diſables him from improving for ſeveral years to come, if not altogether.

When a Farm conſiſts of infield and outfield, the tenant ſhould begin with incloſing his infield, and lay it in graſs; by this means he will get the full benefit of his infield, while he can turn his whole attention, ſtrength, and dung of the Farm towards bringing in and improving his outfield, which, with proper management, will thus ſoon become in as good tilth as his other fields.

If the tenant is to incloſe with hedge and ditch, the method I would recommend is this; in the line, where the fence is to be made, take a ridge of ten or twelve foot breadth; Fallow and dung that ridge for a year; and, if lime alſo can be had, let it be limed: Throw the one half of the breadth of this prepared earth upon the other half, which will make a proper bed for the thorns to ſpread their roots backward as well as downward: When the thorns are laid, throw the ſhoolings above them, and then proceed to caſt out the ditch, which ſhould be five or ſix foot wide, three foot of perpendicular depth, and one foot wide at bottom; and the earth banked up above the thorns with a gentle ſlope, parallel to the ſlope of the ditch; and thus a very little height of dry hedging, or railing on the top, will make an immediate fence. Another advantage of a large ditch and bank is, that they become in two or three years ſooner a fence, as cattle are afraid to take a leap againſt the thorns, which, by the above management, will ſoon make a figure; whereas, when they are planted on level ground, the cattle are not afraid to bruſh through them.

The

The expence of preparing the earth, in the manner prescribed for the reception of the thorns, will be more than compensated by their quick growth, and becoming several years sooner an effectual fence.

Another good way of fencing, if the land is in grass, especially old grass, is, to build a feal-dike, at a little distance from the ditch, six quarters high, which will support the loose earth thrown out of the ditch, and makes an immediate fence on both sides, that will last till the thorns are grown up. The expence of the plain ditch is about eight-pence, and the other ten or eleven-pence *per* rood of six ells.

I would recommend, not to use spades or other iron tools for weeding the young hedges, as they are ready to break the bark of the young thorns; they also waste the earth from their roots, and leaves them bare, besides filling up the ditch by the falling earth.

I should stop here till I see, if what I have said is accepted of, as likely to be of use; but I shall answer a little to two of your questions.

Among the diseases of cattle, one is callled the Livercrook, which attacks and kills calves of about ten days old. This is occasioned by too long fasting, and giving them cold milk. Now, if they were fed with milk warm from the cow, at least in less than an hour after milking, and kept lying dry, not one in fifty would catch the disease.

Your 21st question concerning cattle is, What are the marks of a good bull? I shall begin with the head, which should be small, especially at the mouth; full eyes; long small horns, standing rather high; a long small neck, wide breast, round barrel; streight back; wide neck; short legs; small boned in proportion to his bulk; a thin soft skin; and the colour a bright red with some white spots. Till I see if this is of any use, I rest,

East-Lothian, Nov. 6. 1772. Your humble servant, W. B.

ARTI-

ARTICLE XII.

Of the evil of ſetting ſmall Bitts of Ground to Tradeſmen.

[In a Letter to the PUBLISHERS.]

AS the improvement of Agriculture is the ſureſt means of improving the country, your propoſal of publiſhing a periodical work for that purpoſe, has, I dare ſay, met with general approbation from every lover of it. You have very properly obſerved, that in all improvements gentlemen of fortune ſhould take the lead, and ſhould be at ſome pains to encourage and ſupport their tenants, whereby they would be brought to enter into their views of improvement with ſpirit and activity; and would gentlemen think a little more on this ſubject than they do, they could not fail to perceive that it would be much for their own intereſt as well as the good of the community. However backward common farmers in general may be to enter upon new things, yet there are to be found among them many that would prove good farmers, if they had proper ſupport and encouragement. Perſons of good character, and of a competent meaſure of education and common ſenſe, with a ſtock calculated for their undertaking, ſhould be ſought out and preferred: And the farms ſhould be ſo regulated, with reſpect to quantity and quality, as to afford a ſufficient employment for eight, ten, or twelve horſes every day in the year: Gentlemen ſhould deſcend a little from their affected greatneſs, and enter into greater familiarities with their tenants, whereby they would be better able to judge, who was proper to be preferred to vacant farms, and who among them deſerved countenance and encouragement. Whereas, at preſent, the man that offers the higheſt rent is ſure to be preferred, whatever his character may be, either as a man or a farmer.

To ſuch gentlemen I would recommend what you have ſaid in your introduction, both on the riſe of rents and the length

length of tacks: if they would conſider theſe things, without being blinded with the views of immediate intereſt, their conduct in theſe reſpects would ſurely be very different; and the improvement of the country would make a quicker progreſs.

I write you this principally to take notice of a reigning evil that prevails over the greateſt part of this country; that is, the ſetting ſmall bits of land to tradeſemen: To this the landlord is tempted by a high rent; and the tradeſman is eager to have it at any rent, to maintain his cow, as he alledges. This practice is pregnant with many evils: for as the tradſeman muſt depend upon the neighbouring little farmers for his horſes to dung, plow, and harrow his grounds, that can only be obtained when the farmer's leiſure can afford it; and conſequently the ground muſt be neglected and mis-timed; and the crop bad in proportion; and it is generally obſerved that no grounds are in worſe order, and fuller of weeds and trumpery, than the acres round country villages ſet out in this manner. The cow in the mean time is half ſtarved, and for want of graſs is fed upon graſs-baulks or along the road ſides or hedges by little boys and girls, who there learn the rudiments of theft, and think nothing of allowing the cow to take a pluck of the neighbours corns; or the cow nibbles the young thorns, or breaks over the fences: By this management the tradeſman in fact is a loſer; for he muſt be often taken from his work to attend his labouring, which, if his trade is worth any thing at all, will not, with the deduction of the high rent he pays, compenſate the loſs he ſuffers; and his children too are bred up to a habite of idleneſs, ſauntering, and theft, when they would be better employed at the ſchool or at the pirn. The little farmer too, who employs his horſes to labour theſe acres, is tempted by the hire, and the bait of a good dinner, to neglect his own labour, and thereby mis-times his own farm: While the actual and induſtrious farmer in the neighbourhood has his hedges and fences deſtroyed, and his graſs and

corn

corn eat and trampled down; and at the ſame time he is deprived of the proper encouragement for keeping a dairy, the produce of which might ſupply the tradeſman's family with milk and butter, which, for want of that encouragement, he is obliged to ſend to a diſtant market.

Theſe things are well worthy the conſideration of gentlemen land-holders. How far it is the intereſt of the community, that every man ſhould adhere to his own trade and buſineſs, I leave to deeper heads to determine: But from my practice of farming from my infancy, I am convinced, that buſineſs can never be carried on to purpoſe by any body but actual farmers.

If you think theſe things worth publiſhing, you may put this letter into your next number of the Scots Farmer: As I ſend it to you only as an approbation of your ſcheme; and if you go on with it, perhaps I may ſend you ſome practical obſervations now and then, which I will always ſubmit to your diſcretion. And I hope my brother farmers in Scotland will take the opportunity you now give them, of publiſhing their remarks, which though they may not give any new inſtructions to ſome, may ſtill prove of ſervice to others: And if we can do a little good beyond ourſelves in our day and generation, God forbid we ſhould grudge it; and we ſhould thank God who has put that in our power. I am,

Clakmannan-ſhire, Your moſt humble Servant,

Nov. 10. 1772. J. G.

The AVERAGE of the prices of GRAIN in HADDINGTON, marked for each Month of the preſent year 1772.

	WHEAT.						BARLEY.						OATS.						PEASE.					
	1.		2.		3.		1.		2.		3.		1.		2.		3.		1.		2.		3	
January	20	8	19	8	18	11	16	1	15	2	13	9	14	1	13	2	11	1	13	0	12	0	11	1
February	21	5	20	3½	19	5	16	1	15	3½	14	0	14	5½	13	9	11	5	13	7	12	6½	11	9
March	22	0½	20	10	19	6	16	4	15	4	13	9½	15	0	14	0¼	12	2	14	3	13	5	11	8¼
April	22	9	22	1½	20	1½	16	7½	16	0	14	8	15	2	14	1	12	6	14	3	13	5	12	1
May	24	1	23	0	21	5	17	8	16	9	15	7½	15	2½	14	10½	13	5	14	3½	13	7	12	6
June	24	7½	23	6¾	22	3½	17	8	16	9½	15	3½	15	4½	14	9¼	13	4½	15	0¼	14	1½	13	2
July	24	3½	23	2½	21	10½	16	7	15	10	14	10	12	2¼	14	6	13	3½	15	10	14	9¾	13	0
Auguſt	25	0	23	9	22	7	17	6½	16	8	15	4½	15	11	15	0¼	16	4¼	16	8¾	15	10½	14	0
September	23	0	21	9	20	5	17	10½	16	9	15	4½	16	0	15	0	13	9	17	0	16	0	14	8
October	21	3	20	3	18	9	16	10½	15	11¼	14	9½	16	10½	13	8½	12	11½	16	0	14	7½	13	6

THE SCOTS FARMER,

DECEMBER 1772.

ARTICLE XIII.

*Of Weeds as an impediment of Vegetation—the different kinds of Weeds—methods of deſtroying them—Weeds propagated by the ſeed—by the root—of deſtroying Shrubs—Whins—Broom—Brambles *.*

Dickſon's Agriculture, vol. I.

I. *Of Weeds as an impediment to Vegetation.*

ALL plants are not uſeful to man: Some of them are not only uſeleſs; they are alſo noxious; and theſe we call Weeds. In agriculture, we may conſider as weeds all plants that grow upon a field of a different kind from what

* Mr Dickſon, after treating of vegetation, treats of the impediments to it, and how they may be removed. The chief impediments he treats of, are weeds, and too much water. And the reaſon why he treats of theſe before treating of tillage, is, that when he comes to tillage, he may have all the different deſigns of it in view. Tillage is deſigned not only to encreaſe the food of plants, and enlarge their paſture; but alſo to deſtroy weeds, and drain land by laying it up in proper ridges. Now, in treating of tillage, it is neceſſary to have in our view the deſtroying of weeds, and draining of land; as well as the increaſing the food of plants, and enlarging their paſture; and therefore it is neceſſary to mention theſe impediments to vegetation, and the methods of removing them, before tillage is treated of, with a view to ſerve theſe purpoſes.

what are intended by the farmer; there is not a field where we do not find ſome of theſe; they grow in the greateſt plenty on the richeſt ſoils.

Weeds will appear impediments to vegetation, if we conſider theſe things following: They rob the plants, we deſire to cultivate, of their food; they prevent theſe plants from branching out from the root, and ſome kinds of them leſſen the vegetable paſture in the land where they are ſuffered to grow.

Weeds are nouriſhed by the ſame food that would nouriſh uſeful plants; and therefore, when allowed to grow along with them, muſt rob them of part of their food. Although it is allowed, that the food of all plants is not exactly of the ſame kind; yet as plants ſuck in whatever juices, or ſmall particles of matter are touched by their roots, it may be juſtly ſaid, that all kinds deprive the earth of that vegetable food which would nouriſh others. Experience convinces the Farmer of the truth of this: for he finds, that his crop is bad in proportion to the quantity and kinds of weeds with which his land is infeſted.

Weeds cover the ſurface of the land on which they grow, and thereby, confining the plants we deſire to cultivate, prevent them from branching out from the root. For all plants, when confined by others at their ſides, inſtead of branching out, as ſome of them are inclined to do, make vigorous efforts to get above thoſe by whom they are confined.

Some perſons have attempted to ſhow, that corn never wants room to grow; and that it is the want of food alone which makes ſome plants decay, when they are ſet too thick. If this is true, weeds can do no harm to plants, by covering the ſurface, and confining them while they grow. But let a perſon caſt his eyes upon a plantation of any kind, and he will immediately obſerve, that where the plants are placed very near to each other, they ſtretch out chiefly to the length; and where they are placed at a greater

ter diſtance, they grow not ſo much to the length, but more to the thickneſs, and branch out on all ſides; ſo that the proportion of nouriſhment which the plants receive, makes them grow either to the length principally, or to the thickneſs, and branch out, according as they are placed near, or at a diſtance from each other. The ſame thing happens, when there are many weeds growing amongſt corn. Some fields are ſo much infeſted with weeds, that though no grain is ſown, the plants come up very thick. This obliges the Farmer to give plenty of ſeed. In conſequence of which the ſurface is quite covered; and the plants of corn being confined by the weeds, inſtead of branching out from the root, and producing two or more ſtalks, as they are naturally diſpoſed to do, puſh up one ſtalk only; that ſo they may the more eaſily get above their rivals. The proportion of nouriſhment which they receive, makes them grow to the length, inſtead of branching out from the roots; makes them produce one ſtalk and ear only, inſtead of many. Experience confirms the truth of this. When land is rich, and at the ſame time much infeſted with weeds, the plants of corn grow tall enough; but ſeldom have more than one ſtalk.

Some kinds of weeds have great numbers of ſmall roots which they extend to a great diſtance. Theſe roots bind the ſoil in ſuch a manner, as to leſſen the vegetable paſture; or rather, make it very difficult to enlarge it by tillage. It may be obſerved, that when a field is much infeſted with quickening graſs, the ſoil is ſo firmly bound together by the roots, that it is not poſſible to pulverize it. When plowed, the earth of the furrow is turned over whole, and the harrows ſcarcely make any impreſſion upon it.

It is of great importance therefore to know, how to deſtroy theſe uſeleſs and noxious plants; that ſo all the vegetable food in the ſoil may be applied to the nouriſhment of the uſeful plants we deſire to cultivate; that theſe uſeful

plants

plants may have room to extend themſelves, and branch from the root on all ſides; and that the vegetable paſture, which, by the rain that falls, and the natural weight of the ſoil, is always leſſening, may be more eaſily enlarged.

II. *Of the different kinds of Weeds.*

Plants are commonly divided into two ſorts; annuals, that is, ſuch as in one year come to perfection, carry ſeed, and die; and perennials, that is, ſuch as continue in life for more years than one. Annual plants are almoſt all propagated by the ſeed. Perennials are propagated, ſome by the ſeed, others by the root, and a third ſort both by the ſeed and root.

Weeds may be divided in the ſame manner, into annuals and perennials. But, in treating of the methods of deſtroying them, we will be better underſtood, if they are divided into theſe two ſorts; weeds that are propagated by the ſeed, and weeds that are propagated by the root. It is needleſs to conſider the Weeds that are propagated both by the ſeed, and the root, as a third ſort. For when their ſeeds infeſt the land, they muſt be treated as weeds that are propagated by the ſeed; and, when their roots infeſt the land, they muſt be treated as weeds that are propagated by the root. It is neceſſary, however, to divide weeds into theſe two ſorts, into which we have divided them: for in ſome caſes, that kind of management poper for diſcouraging the one ſort, tends to encourage the growth of the other.

But, beſides theſe two ſorts of weeds mentioned, it will not be improper that we likewiſe take notice of thoſe ſhrubs by which ſome land is greatly infeſted. Theſe, though they are not commonly reckoned in the claſs of weeds, and though ſome of them may have their particular uſes; yet, as they are plants different from what the Farmer deſires to cultivate in his fields, they fall under the definition which we have given of weeds, and ſhall be reckoned by us a third claſs.

III. *Of*

III. *Of the methods of deſtroying Weeds.*

The deſtroying of weeds is certainly one of the moſt important parts of agriculture. By allowing them to grow, we allow the land, as was formerly obſerved, to be robbed of its vegetable food, and its vegetable paſture to be greatly leſſened.

It may be enquired, What becomes of this vegetable food of which they rob the land? It is either conveyed to the air, and ſent to enrich other land, or it is turned into a form that renders it deſtructive.

When weeds wither and putrify above ground, the ſalts and oils which they contain, and of which they deprived the land on which they grew, become volatile, and fly off into the air, and leave little more than their earth remaining.

When weeds carry ſeed, and ſhed it upon the land, and when the roots, by the nouriſhment they receive, are enlarged and extended; the vegetable food, of which they have deprived the land, is turned into a form that renders it deſtructive, into ſeeds and roots, by which the land is further exhauſted.

The ſeeds and roots of weeds, though deſtructive to uſeful plants, by robbing them of their food, yet they contain vegetable food in themſelves; and, when the ſeeds are picked up by birds, and the roots eaten by animals, the vegetable food is carried off. But, if theſe weeds are deſtroyed, and reduced to a ſtate of corruption, the vegetable food, which they have taken from the land, and rendered deſtructive, is reſtored to it, and becomes beneficial: So that land that is poor, and unfit for carrying crops of uſeful plants, by being full of weeds, may be made rich and fertile, by deſtroying them. To confirm this, it may be obſerved, that land full of weeds receives the greateſt benefit from fallowing.

From theſe things, it appears, that the deſtroying of weeds is one of the moſt important parts of agriculture. As it is important, ſo likewiſe it is difficult.

There

There is ſcarcely a field, in which we will not obſerve weeds of the two firſt kinds mentioned; of the kind that is propagated by the ſeed, and the kind that is propagated by the root. Some of theſe, perhaps, it may be eaſy to deſtroy, as they are foreigners, and not adapted to the ſoil; but others of them being natural to the ſoil, in that kind of it that is moſt proper for them, it may be expected, not only that it will be very difficult to deſtroy them, but alſo, that, by the culture given to the land, they will thrive wonderfully, carry great crops of ſeed, and multiply and extend their roots. As the deſtruction of weeds is then ſo important and difficult, it is a work that muſt be particularly attended to.

Weeds have been divided into three ſorts. To deſtroy theſe different ſorts, different management is required. It is neceſſary, therefore, to treat of them ſeparately.

IV. *Of the methods of deſtroying Weeds that are propagated by the ſeed.*

Weeds are very different in their natures. The ſeeds of ſome of them will putrify in a few years, if they lie moiſt in the earth, and are prevented from vegetating. But the ſeeds of others will lie many years in this ſituation, without having their vegetative power deſtroyed†. This we know from experience. Land infeſted with different kinds of weeds, has been frequently thrown out into graſs, and allowed to remain in that ſituation for ſome years. Tho' allowed to lie only a few years, ſome kinds of weeds are found

† Of the firſt ſort are the charlock and poppies; of the ſecond ſort is the wild oat.

It is uncertain how long ſome ſeeds may be preſerved without loſing their vegetative power. 'Tis ſaid, that, two months after the great fire in London, a ſpecies of *eryſimum*, or hedge-muſtard, appeared in great plenty, where houſes had been for a thouſand years.

found to be deſtroyed, when the land is broke up again; but, though it lie twenty years, ſome other kinds are found in as great plenty as before.

The firſt ſort may be deſtroyed by turning the land infeſted with them, from tillage into graſs, and allowing it to remain in that ſituation for five or ſix years.

Both ſorts may be deſtroyed by bringing the ſeeds to vegetate, and then tearing up the young plants. Seeds will not vegetate without air. Some require a greater proportion, and ſome a ſmaller. The ſmall ſeeds will not vegetate without a very great proportion of it. It may be obſerved, in fallowing land which is full of weeds, that great numbers of them appear after every plowing. This ſhows that ſome of the ſeeds had not a ſufficient quantity of air, in their former ſituation, to make them vegetate. Now, to give theſe ſmall ſeeds a proportion of air neceſſary for them, they muſt be brought near the ſurface, and the earth about them rendered free and open. If the land is frequently ſtirred and turned over, both theſe will be done. For every time the land is ſtirred and turned over, ſome ſeeds, that before lay deep, are brought near the ſurface, and the earth about them alſo rendered free and open: And beſides, the plants that have appeared are thereby torn up and deſtroyed.

Every farmer that practiſes ſummer fallowing, is now fully convinced of the truth of this. For he obſerves, when the ſeaſon is favourable, and his fallow is well and frequently plowed and harrowed, and time allowed betwixt every plowing and harrowing for the weeds to vegetate, that his land, for ſeveral years, is not ſo much infeſted with weeds as before.

It has been obſerved, that ſeeds will not vegetate without air, and that to give the ſmaller kinds the quantity which they require, they muſt be brought near the ſurface, and the earth around them rendered free and open. It is neceſſary likeways to obſerve, that water is as requiſite to promote vegetation as air; and that the bringing ſeeds near

the

the ſurface, and rendering the earth free and open around them, as it ſupplies them with air, tends to deprive them of water. In the performance therefore of thoſe operations by which the land is ſtirred and turned over, to promote the vegetation of the ſmall ſeeds, great care muſt be taken to preſerve the ſap, as much as is poſſible. This will be done, if, in ſtirring the land, the ſurface is made ſmooth and plain. It is obvious, that, when the ſurface is rough and uneven, the drought has eaſy acceſs; but, when it is ſmooth and plain, the winds have leſs influence, and the ſap is better preſerved. Every farmer will obſerve, that, in dry weather, when land is allowed to lye ſome time after it has been plowed, without being harrowed, the drought has eaſy acceſs, the ſap is exhaled, and the ſeeds in it, though near the ſurface, and the earth around them free and open, yet, being deprived of water, are prevented from vegetating: Whereas, when the land is harrowed immediately after it is plowed, the ſap is preſerved, and the ſeeds ſpring up. Hence the cuſtom of ſowing barley immediately after the plough. Barley is commonly ſown in a dry ſeaſon; and therefore the land is not allowed to lye long after it is plowed, leſt the ſap ſhould be exhaled; but is immediately ſown and harrowed, by which the ſap is preſerved.

The vegetation of ſeeds in land is promoted, not only by ſtirring and turning over the land, but alſo by the application of dung and ſome other manures. Dung raiſes a fermentation; this opens the pores of the ſoil, allows the air to reach the ſeeds, and gives them liberty to put forth their roots. If dung, therefore, is laid upon land infeſted with weeds, and the land carefully ſtirred and turned over ſeveral times, all the ſeeds in it, by degrees, will be brought to vegetate; and thus the weeds will be deſtroyed.

It muſt be owned, that this practice, though proper for deſtroying weeds, may, in ſome caſes, deſtroy ſome of the virtues of the dung, before it is applied to promote the vegetation of the uſeful plants we deſign to cultivate. Dung

promotes

promotes vegetation, by producing a fermentation in the ſoil upon which it is laid, and by this fermentation ſeparating its particles. If this fermentation is, in a great meaſure over before ſeed is ſown, the natural weight of the ſoil, making it ſubſide, will render the vegetable paſture, while the plants are growing, much leſs than it would have been, if the dung had not been ſo ſoon laid on: And more harm may be done by this, than advantage gained by deſtroying the weeds. But, though it may be improper to follow this method, when ſeed cannot be ſown for a conſiderable time after the dung is laid on, as is the caſe ſometimes when ſummer-barley is ſown on fallow; yet it may anſwer very well when ſeed is to be ſown ſoon after, as is the caſe when wheat is ſown. The advantages ariſing from the deſtruction of the weeds, though not in the firſt caſe, yet in the laſt, may probably do more than over ballance the loſs ariſing from ſome part of the ſtrength of the dung being exhauſted before the ſeed is ſown.

It may, perhaps, be thought a little ſurprizing, that dung ſhould be propoſed as a means of deſtroying weeds, when it is univerſally conſidered as a great encourager of them. It is certain, that the laying dung upon land makes more weeds appear than otherwiſe would do. If the ſeeds of theſe weeds are in the dung, it muſt be owned, that it increaſes, and not diminiſhes their number. But, if the ſeeds are in the land, and the dung only makes them vegetate, it becomes a proper mean of deſtroying them.

It ſeems to be the general opinion, that the great plenty of weeds that appear on land after it is dunged, are produced from ſeeds mixed with the dung. But there are ſome reaſons to believe that this is a miſtake.

It is obſerved, that dung produces weeds, when it is taken from a dunghill, ſo much heated as to deſtroy the vegetative power of any ſeed.

It is obſerved likewiſe, that the ſame dung produces weeds, according to the nature of the land on which it is

laid. It often happens, that dung carried from a town is laid upon different ſoils; and it is certain, that this dung does not produce the ſame kind of weeds on all ſoils, which it would do, if the weeds aroſe from ſeeds mixed with it; but always produces the weeds, with which the ſoil upon which it is laid is naturally infeſted.

Theſe obſervations make it very probable that the great quantity of weeds produced by dung, is entirely owing to the fermention occaſioned by the dung; by which almoſt all the ſeeds near the ſurface, receiving a proper quantity of air, are thereby brought to vegetate.

To this it may be objected, That ſuch numbers of weeds do not appear upon land that is new marled, as upon land that is dunged. But, in anſwer to this, let it be obſerved, that a great quantity of marle is laid on, and in large pieces, and that it is plowed in with a ſhallow furrow: And therefore, though a fermentation may be raiſed, yet the undiſſolved marle prevents a great part of the ſoil from being expoſed to the air, in ſuch a manner as to make the ſeeds in it vegetate; and alſo occaſions ſuch a hollowneſs, that, after the ſeeds begin to vegetate, ſuch of the plants as are tender (and ſeveral ſorts of them are not ſo hardy as corn) are eaſily deſtroyed by drought or froſt.

Before we leave this article, it is neceſſary to obſerve, that the ſeeds of ſome weeds, particularly the different ſpecies of the thiſtle, are carried to a conſiderable diſtance by the wind; and where any earth is thrown up in ſuch a manner as to intangle them, as at the root of a hedge, or ſide of a ditch, there they appear in great plenty. It is ſurpriſing, that many farmers allow them to grow there undiſturbed: The conſequence of which is, that their ſeeds are carried in great plenty into the adjacent fields, and thereby great damage is done; which might have been prevented by cutting them down, at a ſmall expence, before their ſeeds were ripened.

V. Of

V. *Of the methods of deſtroying Weeds that are propagated by the root.*

There are many different kinds of weeds propagated by the root, and theſe of very different natures. Some of them infeſt the land that is in tillage, and others the land that is in graſs. Any perſon may ſatisfy himſelf of this, by inſpecting our fields. The farmer is very ſenſible of it: He knows that ſome kinds of weeds flouriſh and increaſe in his land, while in tillage, if he does not take all pains to diſcourage them; and when he lays down his land in graſs, other kinds that did not appear before, ſoon diſcover themſelves; and, if undiſturbed, continue to increaſe, while the land remains in that ſituation†.

The firſt ſort, it ſeems, have ſuch a tender blade, and ſuch tender roots, that they cannot pierce earth that is hard; but are of a kind that increaſe very faſt, when the ſoil is free and open.

The ſecond ſort have the blade and roots ſo ſtrong, that there is ſcarcely any ſoil that, of itſelf, will become ſo hard and ſtiff, as to prevent them from making their way thro' it; but are of ſuch a nature, as to be eaſily torn up, when the land is free and open; and do not eaſily ſtrike root again when torn up.

The natures of theſe weeds point out methods of deſtroying them.

The firſt ſort, as they chiefly infeſt land in tillage, may be deſtroyed by turning the land from tillage into graſs, and allowing it to remain for ſome years in that ſituation. This is confirmed by experience. Land over-run with quickening graſs, and other root-weeds of the ſame kind, is frequently laid down in graſs, and allowed to continue for ſome years without being plowed. This land, when broke

† Of the firſt ſort is the quickening-graſs, or couch-graſs. Of the ſecond ſort are the yellow rag-weed, the mountain-daiſie, &c.

broke up again, if allowed to lye in graſs for ſix or ſeven years, is found to be clean, and the roots of the weeds deſtroyed.

The number of years neceſſary for deſtroying the roots, depends upon the nature of the ſoil. If the ſoil is naturally hard and ſtiff, it is the ſooner brought to ſuch a ſituation, as to prevent the roots and blades of the weeds from piercing it. But, if it is naturally ſoft and ſpungy, it takes a longer time before it is brought to that ſituation; for while the blade, or roots of the weeds, can pierce the ſoil, their vegetation is not prevented. In ſome ſoils, it is ſix or ſeven years before the roots of the quickening-graſs are deſtroyed.

The number of years found neceſſary for deſtroying theſe root weeds, has, no doubt, been partly the occaſion of eſtabliſhing the practice commonly obſerved in treating outfield land †. Three crops of corn are taken, and then the land is allowed to lye ſix years in graſs, or lea. At the end of theſe, the farmer ſuppoſes that the lea is come to maturity, and fit again for being plowed. When it is only two or three years old, it is called, in ſome parts of the country, *calf-lea*; and, if plowed at that age, is commonly very full of roots.

The ſowing land with graſs ſeeds, inſtead of turning it out into lea, deſtroys the roots of theſe weeds ſome years ſooner. For thereby a ſward being brought immediately upon the ſurface, the land becomes firm, the blades of the weeds are unable to pierce it, and the roots are deprived of air. Ryegraſs-ſeed, or the common hay-ſeed, is the

† The arable land in Scotland is divided into infield and outfield. The infield is the land upon which, from time immemorial, the whole dung made in the farm has been laid. Till of late it was always kept in tillage, and is ſo ſtill in many places. The outfield is the land upon which no dung is laid, excepting that the ſheep and cattle are folded upon it. It is ſometimes in tillage, and ſometimes lying lea.

the moſt proper for this. For the plants ariſing from theſe, ſoon cover the ſurface, and, by the number and ſmallneſs of their roots, bind the ſoil. Clover, particularly the broad clover, is improper. For the roots of it being large, they open the ſoil in growing and extending themſelves; and thereby prevent it from arriving at that degree of firmneſs, neceſſary for deſtroying the weeds ſo ſoon, as if no graſs-ſeeds are ſown, but the land immediately turned into lea.

The ſecond ſort may be deſtroyed by turning the land infeſted with them, from graſs into tillage. And it is not neceſſary to continue it long in this ſituation; for the weeds commonly diſappear after the firſt plowing.

But as it may be inconvenient to turn a field infeſted with weeds, from graſs into tillage, or from tillage into graſs; it is neceſſary to conſider, if there are any methods of deſtroying theſe weeds, without altering the ſituation of the land.

When land in tillage is infeſted with weeds, they may be deſtroyed by frequently ſtirring and turning it over in dry weather; for the weeds being removed out of their place, the drought prevents them from ſtriking root again. The ſtirring the land in wet weather, is rather hurtful than beneficial; for though the roots of the weeds are removed from their place, yet the weeds themſelves are only tranſplanted. If the land is wet, they ſoon ſtrike root again; and the quickening-graſs, in particular, having its paſture enlarged, makes quicker progreſs than ever. But if the land is dry, the weeds do not ſo eaſily ſtrike root again; or, if ſome of them ſhould ſtrike root, they continue for ſome time in a languiſhing condition, and if removed out of their place while in this condition, are eaſily deſtroyed by the drought. If land then is frequently ſtirred and turned over, by degrees all the weeds will be deſtroyed: for, by every ſtirring or plowing, ſuch of them as are in a languiſhing

ing condition are deſtroyed, while thoſe that are ſtrong and vigorous are weakened.

When land is to be freed from ſeed-weeds, it cannot be made too fine, nor the ſurface too ſmooth; for the more perfectly theſe are done, the greater number of ſeeds are brought to vegetate. But, when land is to be freed from root-weeds, it cannot be turned up in too large pieces, nor the ſurface left too rough: for the larger the pieces, and the rougher the ſurface, the drought has the eaſier acceſs, and the roots are the more effectually deſtroyed.

When land in graſs is infeſted with weeds, and it is inconvenient to turn it into tillage, the weeds themſelves muſt be pulled up by the root, or frequently cut; which are the only ways of deſtroying them.

Some perſons aſſert, that ſheep are very fond of the yellow rag-weed, by which light land, when laid out in graſs, is very much infeſted. If this is true, the putting ſheep to paſture upon this graſs, for a ſeaſon or two, will effectually deſtroy this weed. This may be the more ſafely recommended, as the trial, though it does not ſucceed, cannot be atended with any danger or loſs.

Some land, after being a few years in graſs, is liable to be over-run with fog. This, 'tis ſuppoſed, is owing to the ſoil becoming ſoft and ſpungy near the ſurface. If this is the caſe, rolling, which makes the ſurface plain, will be of ſome uſe to deſtroy this pernicious weed. It may be obſerved, that, when there is a foot path through a graſs field over-run with fog, not ſo much frequented as to break the turf, the graſs upon the path is clean, without any mixture of fog.

There is a third ſort of weeds found to infeſt both the land that is in tillage, and the land that is in graſs. This ſort have not only the blade and roots very ſtrong, ſo as to be able to pierce the ſoil, though hard, but alſo are of ſuch a nature, as makes it difficult to tear them up; or

have

have their roots of ſuch a kind, that they may be divided into a great number of plants *.

Theſe weeds cannot be deſtroyed, either by turning the land infeſted with them, from tillage into graſs, or from graſs into tillage. But they may be deſtroyed by the methods mentioned, when the ſituation of the land is not changed. If the land is in graſs, they may be deſtroyed in digging them out, or by frequently cutting them: And if the land is in tillage they may be deſtroyed by frequently ſtirring and turning it over in dry weather. This work muſt be performed with ploughs properly made for cutting their roots. This kind of weeds puſh their roots very far down, and their roots are ſo tough and hard, that our common ploughs ſeldom break them. If there are any ſtones in the land, they puſh their roots among the ſtones; and, in ſuch places, the plough not having freedom to act, they continue undiſturbed. In this land too the plough, moſt proper for cutting theſe roots, cannot go with ſafety. But if the ſtones are dug out, and the land plowed with a broad pointed ſoak (ſhare), the roots, by degrees, will be cut, and the weeds deſtroyed.

Beſides thoſe three ſorts of weeds mentioned, there is a fourth that chiefly infeſts land that is wet. Frequent cutting and even digging out by the root, have been tried to deſtroy them, but to no purpoſe. They are not to be ſeen on dry land, and, when on land only inclining to be wet, appear very weak. This points out draining to be the proper method of deſtroying them, which indeed does it effectually.

We ſhall conclude this article with obſerving, that all kinds of root-weeds, and many kinds of the ſeeds of weeds, may be deſtroyed by depriving them of air; for air is neceſſary not only to the vegetation, but alſo to the life of every plant.

When

* Of this ſort are ſome ſpecies of the Thiſtle, and what the ploughmen call *ſit-faſts*.

When land is in tillage, the weeds may be deprived of air, either by burying them deep in the earth, or covering the ſurface. Trenching does the one, and a good crop of peaſe, potatoes, or any other plants that lie thick on the ſurface, does the other.

Fog, by which ſome lands in graſs are much infeſted, it is ſaid, may be deſtroyed in the ſame manner. The method propoſed is this: The graſs muſt be kept from the month of May to the month of December, for winter-paſturing, and next ſeaſon muſt be preſerved for a crop of hay. The fog, by this management, being covered for two ſeaſons by the graſs, is thereby deſtroyed.

VI. *Of the methods of deſtroying the Shrubs, which are conſidered as a third claſs of Weeds.*

There are ſeveral ſhrubs that grow naturally upon our land in Scotland. Some of the land is indeed ſo poor, that, tho' cleaned of them, it would not, without improvement, carry any plants of greater value; and the means of improvement yet known, are at too great a diſtance to bear the expence of carrying. But the whole land is not of this kind: Some of theſe ſhrubs infeſt rich land, which, with ordinary dreſſings, when cleared of them, carries plentiful crops of uſeful plants. The chief of them are the whin (furze), the broom, and the bramble. Theſe ſhrubs are not indeed uſeleſs: The whin, in particular, is of value; but the land upon which they grow, may frequently, however, be employed to greater advantage; which makes it neceſſary to inquire into the moſt proper methods of deſtroying them.

VII. *Of the methods of deſtroying Whins.*

When a field is infeſted with whins, nothing can be done till it is cleared of them. The ordinary way is to grub them out with a hoe. If the whins are old and ſtrong, cutting is not ſo proper, though it could be eaſily done; for if they are only cut, it will ſcarcely be poſſible to plow the field; and

and it is vain to attempt to continue a field in graſs, after it is cleared of whins. For it is ſcarcely poſſible to grub out the whole roots; and thoſe that are left, will immediately ſpring up †. Beſides, there are ſo many ſeeds, that have fallen from time to time, and the places covered with the whins having no ſward of graſs upon them, it may be expected, that they will appear, in a ſhort time, in greater plenty than ever. This makes it neceſſary to bring the land, after it is cleared of them, from graſs into tillage. While the land is continued in tillage, no whins are diſcovered; but if it is thrown again into graſs, in a few years they appear in as great numbers as before. Now, the principal thing to be conſidered, is this; how the whins may be deſtroyed ſo effectually, as to prevent them from over-running a field formerly infeſted with them, when it is turned from tillage into graſs.

It is propoſed by ſome, to cut the plants frequently while young. This, no doubt, will weaken the plants; but it is very uncertain if it will effectually deſtroy them. Pulling them up is certainly a better way; and this, unleſs where they are very thick, is neither troubleſome nor expenſive. If a perſon takes a view of a field formerly infeſted with whins, on the ſecond year after it has been laid out into graſs, he will obſerve the young plants ſprung up; and, if the land is moiſt, he will obſerve, upon trial, that they may be pulled up without any difficulty, even by young boys. If this method is taken, and any of the plants ſo young, as not to be obſerved at firſt going over, they will appear in the end of the ſeaſon, or the beginning of the next; and, even then, will not have taken ſuch deep root, as to render it very difficult to pull them up. 'Tis probable, that, in a field that has long been infeſted with whins, their will be a great number of ſeeds, many of which, from their deepneſs

† This is uncertain. From ſome obſervations lately made, it ſeems probable, that the greateſt part of the whins that appear on a field, where the old whins that have been burnt down, ſpring from the ſeed.

in the earth, will not vegetate, when the land is turned from tillage into graſs; but ſome of them, being nearer the ſurface, the next time this is done, will probably appear. This makes it neceſſary to repeat this work of pulling, as often as the land is turned from tillage into graſs. But then it may be obſerved, that it will become every time leſs troubleſome and expenſive.

But, beſides theſe methods mentioned, there is a ſcheme of management, which, it is probable, in a courſe of years, will effectually deſtroy whins. It is certain, that the ſeeds of whins will not vegetate, unleſs they are allowed to lie in the earth for a conſiderable time undiſturbed. It may perhaps be difficult to aſſign the reaſon of this; but the thing itſelf is certain. While land is kept in tillage, tho' there may be plenty of whin-ſeeds in it, yet they never vegetate. The plants do not even appear till two years after the land has been allowed to reſt. If any perſon will take the trouble to obſerve the young plants at their firſt appearance, he will be convinced, that all of them ariſe from ſeed, and not from any roots that have been left in the land, and not deſtroyed by the plowing. Now, if a ſcheme of management is followed, by which the land is turned from tillage into graſs, and from graſs into tillage alternately, remaining in each for a few years; the whins, by degrees, will be wholly deſtroyed. For every time that the land is turned into graſs, the whin-ſeeds near the ſurface will vegetate; and every time that the land is brought into tillage, the young plants will be deſtroyed.

'Tis acknowledged, that, in ſome places, a practice like this is commonly followed; the land is for ſome years in tillage, and for ſome years in graſs; and yet continues to be as much infeſted with whins as ever. The reaſon of this is obvious. This land is what is called *cutfield land*; that is, land not improved, and that has received but little manure. When brought into tillage, three or four crops exhauſt it; and it muſt lie, at leaſt ſix, perhaps many more years in

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graſs, to recover, before it is worth while to bring it again into tillage. During this time, the whins grow ſo large as to carry ſeed; and the ſeed which they ſhed, being preſerved while the land is in tillage, ſpring up when it is laid down again into graſs. So that, by this method, upon the whole, the quantity of ſeed is encreaſed, rather than diminiſhed. But if this land is improved, and, after a few crops of corn, ſown out with graſs ſeeds; and, after being a few years in graſs, brought again into tillage, and ſo on; by this, the whole ſeeds in the land will be brought to vegetate, and the plants deſtroyed before they are ſo old as to carry ſeed.

It has been obſerved, that land, infeſted with whins, muſt be cleared of them before it can be improved. The expence of grubbing them out is very great. Where the whins are ſtrong and no demand for them, the expence of clearing the lands of them, may perhaps be equal to the value. The work is very tedious, and requires a great number of hands. A more expeditious and leſs expenſive way by the plough has been tried with ſucceſs. A particular deſcription of this probably will be acceptable.

This work is performed by a ſtrong made Scots plough, with a well redd beam. As it requires great force to tear up the roots of the whins, there ſhould be ſix horſes in the plough, yoked in pairs: As the horſes, in ſtepping amongſt the whins are apt to go to a ſide, two drivers are neceſſary; and, as the whins in riſing, are very apt to entangle or choke the beam, there muſt be a man with a pitch fork ready to puſh them away. Such a plow, yoked and attended in this manner, may be made to plow down whins near three feet high, and to tear up roots above four feet long and an inch diameter.

The labour will be leſs ſevere, and the work better done, if the land is ſoaked with water, which it generally is in the winter ſeaſon, when the weather is open.

The greateſt difficulty met with in the performance of this work is, in making the firſt furrow of the ridge. But

in doing this, no regard muſt be had to the equality or breadth of the ridges, but the veerings made in places where there are feweſt whins; and if once an open furrow is made, the work will go on with ſucceſs.

After the land is plowed, it ſhould be allowed to lie till ſummer, when the whins torn up by the plough being withired, may be burned, the land harrowed, and the roots gathered. When theſe things are done, the land may be dreſſed arrording to the judgement of the farmer; only it is proper, that the ſecond plowing be acroſs, the better to tear any thing that may havebeen left firm in the firſt plowing.

When the whins are ſo ſtrong as to make it impoſſible to plow them down, they may be burned; and if the land is allowed to lye a few years after, it may be plowed without great difficulty. On a part of a field where whins were plowed down, ſome of them were ſo ſtrong as to make it neceſſary to grub them out in the ordinary way; in plowing the field, it was obſerved, that it was more difficult to plow that part where the whins were grubbed out, than the other where the whins were ſtanding; though on this as ſtrong whins had been burned down a few years before. Had this part of the field been plowed a year or two ſooner, it is probable, that the work would have been more eaſily performed.

The expence of clearing a field of whins in this manner by the plough, muſt be ſmall in proportion to the expence of grubbing them out in the ordinary way. In a field where the whins were very ſtrong, about a quarter of an acre was plowed at one yoking; about four acres were plowed by the ſame plough; and not above three ſhillings worth of tackle broke, though at firſt four horſes only were yoked.

VIII. *Of the methods of deſtroying Broom*

After being ſo particular with reſpect to the methods of deſtroying whins, it is not neceſſary to inſiſt much upon the methods of deſtroying broom; for they have a reſemblance to

to each other, and may be deſtroyed in the ſame manner. It may be obſerved, however, that broom is not ſo buſhy as whins, and does not ſo much cover the ſurface; and, therefore, may more eaſily be deſtroyed by cutting.

It was obſerved, that, when a field is over-run with whins, it muſt be brought into tillage, after the whins are digged out; otherways they will ſpring up in greater plenty than ever. But it is not ſo neceſſary to uſe a field of broom in this manner. Tho' the broom is growing thick, yet generally there is a ſward of graſs upon the ſurface. This prevents the ſeeds from ſpringing, when the broom is cut; and if the broom is old, and cut ſo low as to take away all the leaves, the plants will die. In this manner broom may be deſtroyed, without bringing the land infeſted with it from graſs into tillage*.

The way in which broom grows, renders it eaſier likewiſe to deſtroy it, than to deſtroy whins, upon land lately turned from tillage into graſs. It was obſerved, that ſome perſons propoſe to deſtroy young whins by cutting. If a plant is in its nature hardy, and if it is difficult, in cutting, to deprive it of all its leaves, tho' it be frequently cut over, yet it will not be eaſily deſtroyed. This is the caſe with the whin: It grows in ſuch a buſhy manner, and puſhes its branches ſo cloſely along the ſurface, that, in cutting, it is not poſſible to deprive it of its whole leaves. But the broom grows differently; it puſhes up one principal ſtem, and the branches from this ſtem are not ſo horizontal as thoſe of the whin: ſo that, if it is cut near the root, it is deprived of all its leaves: By this it is greatly weakened; and, if frequently repeated, is entirely deſtroyed. When broom is old, one cutting, that deprives it of its leaves, effectually deſtroys it; but it is not certain, that one cutting will as effectually deſtroy young plants; and therefore we have

* A kind of ſcythe has been invented, which performs this work very expeditiouſly.

have not adventured to aſſert this, though it is natural to expect that it will.

IX. *Of the methods of deſtroying the Bramble.*

The bramble is a plant very different from either the whin or the broom. It puſhes its roots very far down, and ſpreads them very wide. The roots may be divided into a number of plants, each of which puts forth ſtems. Tho' cut down in the winter, it will grow up again in the ſummer, and arrive at ſuch perfection as to carry fruit. It is very difficult to deſtroy it, eſpecially when there are ſtones near the ſurface; for it puſhes down its roots into the ſeams and clefts of the ſtones, from which it is very difficult to tear them. They lodge there, and tho' frequently cut, yet always ſpring up again. Cutting and tearing up are, however, abſolutely neceſſary to deſtroy them: and, that this may be done in the eaſieſt and beſt manner, the ſtones upon which they grow, ſhould be dug out. The digging out ſtones, and plowing the land in ſuch a manner as is moſt proper for cutting and tearing up the roots of the bramble, may be the more ſafely recommended, as by them many other good purpoſes are ſerved.

If the ſtones, in land infeſted with bramble, are allowed to remain, and the land itſelf badly plowed, and ſeldom fallowed, the bramble will increaſe: but, if the ſtones are carefully digged out, and the land well and clean plowed, and properly and frequently fallowed, the bramble will decreaſe, few plants will appear, and theſe ſo late in the ſeaſon, as not to come to any height*.

If land infeſted with bramble is lying in graſs, and inconvenient to bring it into tillage, 'tis ſaid, that the bramble may be deſtroyed by ſlitting the end or top of the ſtem. This may be tried at very ſmall expence, and therefore may be the more ſafely recommended.

* There are many places in Eaſt Lothian, where, not very many years ago, the bramble was in great plenty; and now, by good plowing and clearing the land of ſtones, is ſcarcely to be ſeen.

ARTICLE XIV.

An inſtance of the ſucceſs of Plowing with Oxen; from Mr YOUNG's *Farmers Tour.*

AT Langford, the ſeat of Wenman Cooke, Eſq; I had the uncommon ſatisfaction of ſeeing a team of oxen in harneſs. That gentleman, who is one of the moſt ſpirited farmers in Derbyſhire, is the firſt who has drawn them in this manner. He uſes ſixteen; and finds that they draw with much greater power than in yoaks, the method in which he firſt tried them: They move much faſter, and are more handy and convenient: He executes all his plowing and home carting with them, at much leſs expence than the ſame could be performed by horſes, or by oxen in yoaks: A ſtriking proof of this is his plowing as much land in a day with three oxen, as the farmers do with four or five horſes; a diſproportion ſo amazingly great, that it decides the point at once, and in the cleareſt manner. He feeds them in ſummer on graſs alone, and in winter on ſtraw, on which he works them moderately; but if hard wrought, then they have hay or ſome turnips.

The harneſs is much the ſame as that for horſes, excepting the collars opening to be buckled on, and alſo to their being worn in the contrary manner to thoſe of horſes, that is, the narrow end of the collars which open, being downwards; and as the chains are faſtened to them in the ſame direction as in horſe-harneſs, the beaſts of courſe draw much higher than horſes: The line of the chains is almoſt up to their backs, but much above the cheſt. This variation Mr Cooke thinks neceſſary, from the different ſhape of horſes and oxen; and it is a circumſtance deſerving attention from all who may be inclined to follow this very uſeful example. I ſaw a team drawing a heavy load of bricks; and obſerved, that not one horſe team in ten outwalked them. The drivers aſſured me, that they worked much better than when yoaked; drawed a greater weight, and were far more eaſily managed. One great benefit of this

this method, excluſive of the increaſed power, is the placing them in a ſingle line in place of a double one, which, in ſome ſorts of plowing, is extremely uſeful. Indeed, in general, the nearer the team is to the weight the greater its power; but this is not the caſe with oxen yoaked, owing merely to that aukward untoward way of driving; for it is well known to all ox-drivers, that the beaſts cannot exert their full force, from the inequality between the couples; as it is common for one beaſt to make its fellow draw all, an inconvenience totally removed in Mr Cooke's method.

I cannot but earneſtly recommend this very great improvement to all who are deſirous of working oxen; and particularly to thoſe who imagine, but falſely, that they cannot move as faſt as horſes; that they cannot draw an equal weight; and that in plowing they trample the land more: All which ideas, however true they might be in reſpect to the yoaks, are undoubted miſtakes if applied to the harneſſed beaſts. Mr Cooke deſerves much of his country for the introduction of ſo excellent a method, which I ſhould apprehend ſufficient with unprejudiced perſons to give the preference to oxen, notwithſtanding all the common ideas in favour of horſes.

ARTICLE XV.

Directions for hiring a Farm.—From the Farmer's Kallendar.

WHEN a Farmer has occaſion to look out for a farm, he ſhould be equally clear-ſighted to all the advantages of a farm, and all the diſadvantages, that he may be able to draw a ballance between them, and compare that ballance with the rent demanded. Let him remember, that he muſt equally diſcard a too ſolicitous prudence, which doubts every benefit, and a too daring courage, which overlooks or leſſens real evils. It muſt be open to almoſt every perſon's obſervations, that the common farmers loſe them-

themſelves very much in deliberating concerning a farm: they have ſo many miſtaken rules of judging, that we very often ſee them reject farms that, ſoon after, prove the fortunes of ſuch as hire them: they are very apt to take one falſe guide in particular, the ſucceſs of the laſt tenant. If a man makes a good deal of money on a farm, or leaves it for a much larger, numbers will immediately apply with great eagerneſs to get it, almoſt without viewing; but if a tenant or two breaks, or is poor on a farm, moſt of the neighbours conſider little further: they attribute all to the land, and avoid it under a ſtrong idea, that, without a fall of rent, no money can be made on it. All theſe notions are abſolute abſurdities; for the management of various farmers is ſo eſſentially different, that ſucceſs depends very little on rent. A farmer, with a proper ſum of money in his pocket, hires a farm, and thrives on it; another, with an hundred pounds leſs, hires it, and ſtarves. Two farmers of the ſame ſubſtance; one manages his land with ſpirit, makes all the manure he can, ſells no ſtraw, does not croſs-crop his fields, drains them, and keeps his fences in good order; he grows rich: The other, a ſloven in theſe particulars, falls into poverty on the ſame land. Theſe are the circumſtances, that make one man rich, and another poor; very ſeldom rent: And ſurely it muſt be apparent, that ſucceeding occupiers, judging of the reſpective farms by the different ſucceſs of theſe farmers, is the taking as blind a guide as they can poſſibly fix on.

Let the farmer, that is debating, whether he ſhould hire a farm that is offered him, examine the ſoil well, to be able to determine its nature, the ſtiffneſs, moiſture, expoſure, levelneſs, ſlope, ſtoneyneſs; what draining, manuring, fencing &c. will be wanting; let him ſee to the roads, diſtance of market, prices of commodities, labour, &c. He ſhould attend to the compactneſs of the fields, and conſider well the covenants relative to the cropping them; for many ſuch are extremely detrimental to a good conduct of the land.

One general rule in hiring a farm ſhould never be forgotten: Fix on good land, and you can ſcarcely pay too much for it; but, for poor ſoils, the leaſt rent is too high to be conſiſtent with profit. By *poor ſoils*, however, are not to be underſtood ſuch as have a command of laſting manures, that work great improvements; nor waſte lands, that, under that falſe denomination, are often found the richeſt of all.

The mellow, rich, putrid, crumbling clays, or rather clayey loams, are of all ſoils the moſt profitable: ſuch as will admit tillage ſoon after rain, and do not bake on hot gleams of ſun coming after heavy rains, when fine harrowed; ſuch land is better worth twenty five ſhillings an acre, than many ſoils deſerve a ſhilling.

Another matter of great import in the hiring a farm, is the taking no larger a one, than the ſum of money a man can command will ſtock properly. A common fault among farmers is the hiring too much land for their money: they are extremely eager to farm as much as poſſible: the certain conſequence of which is, the conducting the ſoil in a ſlovenly imperfect manner. A farmer ſhould never deſiſt from any work, which he knows to be right, from a want of money; and he can only prevent ſuch a ſituation, by hiring no more land than he can manage in a maſterly manner: For let any of them conſider the difference between good and bad huſbandry in all its branches, between the loſs of one, and the certain gain of the other. Making a proper uſe of natural manures, ſuch as marle, clay, chalk, &c. is never done, but by farmers that have plenty of money in their pockets. In the neighbourhood of great cities and towns, variety of manures are to be had, in ſome places cheap; but if the farmers have not money, how are they to make uſe of ſuch advantages? For theſe and many other reaſons, a farmer ſhould never think of venturing on a tract of land, which he cannot abſolutely command; that is, farm as ſeems beſt to him.

ARTICLE XVI.

Of the proper poſition of the Sock on Ploughs, and the reaſons of it.—The order of Plowing practiſed in Eaſt-Lothian *for the different Crops.—Of deſtroying Thiſtles.—Caution in forming Ditches.*

In a letter to the PUBLISHERS.

"WHAT periodical paper is this, which has juſt "now ſtarted into exiſtence, and intrudes itſelf in-"to the far too extended circle of ſuch performances?" may indeed be the language of ignorance or caprice. And truly a thing of this nature is in danger of being rejected by thoſe, for whoſe purpoſe it was originally intended. But whatever may be the dictates of thoſe obſcurers of the underſtanding, it is quite otherwiſe with impartial minds. It is your province, Mr Printer, with thoſe who are the principal promoters of this pamphlet, to make a judicious choice of materials (taken from books on the ſubject), in order that your readers in general may find ſomething new and entertaining. That the prejudices of mankind may be quite overcome, it is neceſſary to ſubvert them by ſlow degrees. To this end, in the preſent caſe, every new ſcheme which may occur concerning the management of land ought cautiouſly to be preſented to public view; elſe the epithet of *trifling*, inſtead of "inſtructive and entertaining," will undoubtedly be affixed to your monthly paper. It ought, in a particular manner, to have the ſanction and authority of repeated experience to recommend it, or to be able, with a clear and forcible conviction upon the mind, to convince the reader of the propriety of adopting it. I queſtion not, but under theſe and other proper limitations, the SCOTS FARMER may at length obtain a numerous train of votaries. And as it is of the miſcellaneous kind, the reader will enter upon each particular letter, without being diſguſted by the length of the whole. And thus, will the improvement of his taſte for reading tend to improve his knowledge

knowledge of Agriculture; and from lazy and inactive, convert him to the greateſt uſe to ſociety.

I am a plowman, Mr Printer; yet you ſee my preſumption in attempting to appear in print: But ſuch is the nature of your invitation upon the blue cover of your preceeding numbers, that I could not avoid attempting to ſerve you in the beſt manner I was able. When attending the plough, my thoughts are often turned upon the conſtruction of that machine; the advantages and diſadvantages that may attend it; and the beſt method of removing the latter. But as every body may be ſatisfied as to theſe points, by peruſing Mr Dickſon's Agriculture (vol. I); and as I have not indeed diſcovered any thing that is not directly or conſequentially mentioned there, it would be unneceſſary to ſpeak further on that ſubject. Only allow me to mention, by way of query, How comes it about that the plough is much more ſteady in her motion, and conſequently more eaſily drawn, when the ſock is fitted to the head in ſuch a manner, as to hang a little below the plane of the head, than when directly in that plane? yet it is truly the caſe in practice; for we have many inſtances of ploughs, which, when newly put to work, will conſtantly incline to riſe upon the points of the irons, when at the ſame time the beam is rather below the ordinary height allowed them; and immediately on giving the ſock more eard will go much better. I know it is very difficult to cure them of this altogether. I took the dimenſions of a plough which had this diſeaſe to a great height. They were carefully marked, but cannot be found at preſent. However, the beam and handles were about the common length with thoſe of the old Scots plough; the horſes were a good ordinary ſize; and I am ſure that the beam was not ſixteen inches at the bolt-hole from the plane of the head, or the bottom of the furrow; and yet ſhe was hardly cured. Now, whether it is, that the poſition of the ſock, when hanging in this manner, by opening the furrow more gradually from the bottom to the top,

top, and thus each part of it preparing the way for another's approach, and making more eaſy admittance to the ſhoulders of it, *i. e.* giving it leſs reſiſtance, and making the machine go more exactly with reſpect to depth; or whether it is the difficulty of placing the beam preciſely in its proper mechanic poſition, which has induced them, I cannot tell; though the laſt ſeems moſt likely; yet this practice always prevails among our common wrights. Hence the lowneſs of the beam; for a trace and cleek-plough with the ſwingle-trees they allow about ſeventeen inches; and for a beam-plough with the ſame, to the foot-horſes, about fourteen. And—but I am rambling, and am like to be carried beyond bounds. I intended only to mention, or little more, the common ſeaſons of our plowing and ſowing in this corner, eſpecially as the ſubject ſeems to lie directly in your plan. Here it is then without further preamble:

The farmer, like a principal wheel in a machine, enlivens and animates as it were every inferior one; and now, as his action is of the higheſt importance to ſociety, it is a matter of the firſt moment to have that properly directed. What then can be of more earthly concern to him than the ſtudy of Agriculture? But I ſhall forget my promiſe. The farmer, having gathered in the bounty of indulgent Heaven, returns to the plough in order to till his lands, which I ſhall repreſent, for order ſake, lying in the following different circumſtances: viz. Having carried wheat, barley, oats, peaſe, and ſome of it ſummer fallow. Now he plows his land for wheat, and either ſows it immediately, if wet clay, or in October or November, if otherwiſe. This in general is reckoned the beſt ſeaſon. Some people in the Merſe actually ſow it in the month of Auguſt. This grain is either ſown on ſummer-fallow or after peaſe. The firſt caſe ſeldom, but when a heavy wheat-rent obliges the tenant. I ſhall here mention the common methods uſed to prevent Flack (Smutt as you call it) amongſt the wheat. Some people

ple effectually free themſelves of it by a conſtant change of ſeed with their neighbours. The good effects of this it ſeems depend on the contraſt of the ſoils on which it grew, and on which it is to be ſown: Hence it ſometimes fails. The moſt effectual method ever practiſed is pickling and liming. The pickle may be any kind of liquid made ſtrong enough with ſalt to float a hen's egg upon its ſurface, only let urine be avoided as very hurtful when the wheat is to continue even but a night in it. I never knew the wheat the worſe of lying in the pickle, however long, if it was not too freſh; for freſh water ſwells it, though the other does not. In the morning deſtined for ſowing, the pickle is drained from it, and the wheat caſt by degrees on the floor, and quick lime riddled upon it till dry enough for ſowing. Some water and lime it at once.

When the wheat ſeed is over, the land which has carried the firſt crop of wheat, and ſome of the peaſe land, is winter fallowed for barley; and that which carried barley, for oats. By the winter fallowing of his clay land, which he endeavours by all means to have done before the winter froſt ſets in, the farmer intends to expoſe it to receive nouriſhment (vegetable food) from the air, to mellow the ſurface, and obtain a good mould for the ſeed. In this ſeaſon too, when the land is plyable, he commonly gives the enſuing ſummer fallow the firſt furrow. I had almoſt forgot to ſpeak of the ribbing oat land too before the winter, which is attended with conſiderable advantage. In this country it is often ribbed a-croſs the ridges, and the looſe mould caſt upon firm land; hereby a new mould indeed is expoſed, but is apt to be very rough by not having been plowed; a method therefore of looſing the whole is certainly the beſt It is commonly obſerved, that a vaſt quantity of muſtard, &c. ruſh up in the fields thus managed along with the oats; but if the oats are not ſown till theſe are fairly brearded, it appears the moſt favourable method for deſtroying them. As it is here unneceſſary to attend the farmer in any of his operations but that of plowing,

ing, we ſhall then introduce his ſpring labour, after the winter and his horrible attendants have retired into their own dominions.

The huſband man now betakes himſelf to the plough, and according to the preceeding winter he muſt exert himſelf in that employment. If it has been bad, as is often the caſe, his oat land may be moſtly to plow; if not, he goes thro' what remains of it with great eaſe. If it has been ribbed, he now plows it a ſecond time; turns over the remainder of his intended fallow and any other fields which may be yet unplowed. About the end of February and in March, he ſows his oat and peaſe ſeed: And as he did not chuſe to plow his peaſe land before the froſts, for making it too fine, ſo now he has a rough mould, which he reckons of advantage in protecting the broad tender leaf from the inclement blaſts of the ſpring. It is ſtrange what fine crops of peaſe are gathered from land which has been very wet plowed and ſown; but this is moſt certainly very unfavourable for the land. If the peaſe are very heavy upon the ground when in good heart, the farmer reaſonably expects a good crop of wheat; and indeed this never fails on the land account. The peaſe prevent the vegetation of every annual weed, and even the couch-graſs in a good meaſure: They raiſe a kind of fermentation on the ſoil; keep it moiſt even in dry ſummers; and ſome how or another inrich it conſiderably, and makes it capable of producing ſuch good wheat. It is not ſo with beans. Their effects are quite oppoſite; yet I believe they are very profitable; and their ſtraw is affirmed to be as good, at leaſt for horſes, as that of peaſe.

When theſe ſeeds are ſown, the ſteering of the barley land which has been winter fallowed, becomes the next object of attention. In general this is reckoned of vaſt importance. To kill the couch graſs and annuals, is certainly a principal motive. So different are they, however, that they require quite oppoſite methods to deſtroy them. The firſt,

that

that the ſurface be left unharrowed, that their roots may be ſcorched and withered. The ſecond, the contrary, that they may have ſap to vegetate, and thus be deſtroyed; and the laſt too is neceſſary to prevent the land from turning up cloddy at ſeed-time. The farmer therefore, to attain all theſe ends at once, harrows it heartily immediately after the plough, and employs hands to gather the graſs roots to burn. Thus, at the ſame time the greateſt part of the graſs is taken out, and the land harrowed in for the other purpoſes. It is impoſſible almoſt to clear a field effectually of the Crop, the moſt pernicious annual that infeſts a field. The whole ſoil is full of the ſeeds of it, which will live, I believe, a whole century, if not expoſed to the air: And let this be done ever ſo often, we will always have ſome, which, in the intervals of fallowing, will increaſe to a very great degree. Sometimes when a good crop of barley might be expected, the crops will almoſt entirely choke it. But I have frequently ſeen a plump battering ſhower after harrowing prevent this, by forming a kind of cruſt on the ſurface, and preventing their vegetation; yet this is not always proof againſt them; for the weather continuing dropping, ſoftens this cruſt, and allows every thing capable of vegetation to puſh its way.

The barley is commonly ſown in this country in April and May. Sometimes upon the winter furrow, when the land is new and clear, but for the moſt part immediately after the plough; it cannot be too finely harrowed and rolled when looſe and open in its nature. The farmers upon the ſea-coaſt are often ſupplied with ſea-ware about this time, when it is much richer than in winter. If he cannot have it plowed down, which is beſt, he lays it upon his barley any time after it is ſown, till it is ſome days brearded. In this laſt caſe, if the weather is ſhowery, the ſalts produce the fineſt effects; the barley takes on the fineſt verdure; the blade becomes plump and rich. Barley thus produced from ſea-ware, is frequently bought with great keenneſs by people

people at a diſtance from the ſea, on account of its earlineſs.

When the barley ſeed is finiſhed, the ſummer fallow becomes next the object of the farmer's care and attention; he endeavours to purge it heartily of all weeds, and then applies the dung, which raiſes a fermentation, and keeps it open through the winter; and thus, againſt the time of the barley ſowing, the dung is fit for exerting itſelf to the greateſt advantage. If the dung is in a proper ſtate of corruption, *i. e.* well enough rotted; it may be moſt properly applied at, or nearer the ſeed time; for then its volatile qualities are not ſo apt to be exhaled, being ſeldomer expoſed to the ſun.

About the end of June or July is the common time of ſowing turnip; the advantages of them, to be ſure, are evident, when ſown upon proper ſoil; but, eſpecially when the land of itſelf is the leaſt inclined to wetneſs, or even only meets with a wettiſh ſeaſon, the horſes and carriages in taking them off do incredible damage to it. The loſs, in this reſpect, when fairly computed, is more than ſufficient to over-ballance the profits. What more diſadvantageous ſituation for land, than, in place of being gathered up to defend the winter, being all poached with horſes and carts, and every impreſſion of either filled with water! Where the land is quite light and dry, the turnip may certainly be propagated to great advantage.

Allow me now, good ſir, to mention a method practiſed here ſometimes, of killing the thiſtle, whoſe roots are ſo long as to deſcend many fathoms into the earth (as is often ſeen in quarries). The method then is no more than to cut them at Lammas in graſs parks. At this time they are declining faſt, their ſtrength being employed in ripening the ſeed: Hence are they open in the heart. Into their hollow the rain deſcends through the winter; the wind and ſun dry them, and ſo on alternately till they are rotten. I have pulled them from the ground in the ſpring following

in this ſituation. To cut them ſooner, the laſt grows up; and later, the ſeed ſhakes.

Your correſpondent W. B. has given you the beſt method of preparing land for planting hedges (p. 85.) I ſhall only mention a ſmall circumſtance, which, however, is ſeldom noticed, and that is, the cutting up the ground for hedges. It is a common practice with experienced ditchers, to widen their ditch as they go up hill, or take it in when coming down. We ſhall examine how far this is right. Now it is plain, that in breaking up a ditch acroſs ridges, it is wider on the crowns than in the furrow of them; for this reaſon, ſuppoſe two lines ſtretched along where the ground is to be broke; imagine inſtruments placed along the lines in proper poſitions for cutting out the ditch at once, and you'll ſee it evident, that they will be nearer each other on the ſurface of the furrows, than on that of the crowns; hence, the ſpade ought always to be kept in the ſame poſition when cutting ground for that purpoſe. If the ditch is cut immediately below the line, its appearance will be intolerable; it will look as if cut by planes in ſo many different directions, according to the unevenneſs of the ground: By the bye, as the furrows are farther from the line than the crowns, the thorn-bed in thoſe places muſt be raiſed higher, in order to bring the thorns more immediately under the line. It is from this that the practice above is borrowed; but it ought only to be obſerved when the declivity or aſcent is eaſy and gradual. In going acroſs high braes, it ought by no means to be regarded; for though the ditch on the braes, and that in the hollow are truly cut with different planes, and very different from one another, yet the hedge comes immediately below the line. Now, Sir, I am done. I wiſh I have not tired your patience. I truſt my attempt ſhall at leaſt be of uſe in filling an empty corner of your miſcellany I am, Sir, Your moſt humble ſervant,

Eaſt Lothian, Dec. 16. 1772. ARATOR.

P. S. The Crop (mentioned p. 122.) is a weed which the Engliſh call *Charlock*; the botanical name is *Raphaniſtrum* or *Rapiſtrum*; and, together with wild muſtard, very much infeſts our corn fields.

ARTICLE XVII.

Of the Farm or Foddering Yard, applied to the purpoſe of raiſing Manure.——From the Farmer's Kalendar.

GOOD and convenient yards are of ſuch great importance to ſpirited huſbandry of all ſorts, that, in the iring a farm, a man ſhould attend to this point; but, if e finds himſelf on a farm, where it has been neglected, or hat the advantageous circumſtances of a new one more han ballances ſuch a matter; in either of theſe caſes, let im determine to remedy it himſelf, which may generally e done at no great expence. Let him run a high, warm, ence about a piece of ground large enough for all his cat-le, contiguous to the barns and other buildings. It will ay the expence of good pales very well; but a much chea-er fence is to build a ſtack of ſtubble, fern, ling, or traw, about eight or nine feet high, and four or five wide, nd to thatch it for preſervation: no fence in the world is o warm for cattle. * This incloſure he muſt gravel at bot-om, to keep it always firm and hard enough to ſhovel up otten dung on. Throughout the leiſure times of the ummer or autumn, a layer, two or three feet deep, of marle or chalk, turf, ditch-earth, &c. ſhould be ſpread n it: and upon that layer the cattle ſhould be foddered with ſtraw or hay all winter. Plenty of ſtubble, fern, or ſtraw, conſtantly ſpreading as faſt as they tread it into dung, or lie wet or damp: the ſtables, cow-houſes, hog-ſties, fatting-ſtalls, if any, ſhould be cleaned on to it; and, if the farmer fats any beaſts on turnips, he will find no method ſo good as to give them in bings in ſuch a yard; by

* Such a fence would be very unneceſſary in Scotland, where ſtones are every where almoſt to be got in abundance. Or it may be erected of mud and ſtraw, the method of doing which is well known in Perthſhire, and ſeveral places in the North of Scotland; where, it is ſaid, that houſes built of theſe materials have ſtood about an hundred years

by which means the quantity of dung he will raiſe will turn out immenſe, provided he has plenty of litter; and no application of the turnip crop will pay better. Whoever will keep an exact calculation of the expences, will find it the cheapeſt way of manuring land. This is the ſyſtem of the farm yards, laid down more particularly by a late author, and with apparent ſucceſs.

A particular attention ought to be paid to the management of it through the whole year; for upon the conduct in this particular, the ſucceſs of the farm will in a very great meaſure depend: And one very great recommendation of this farm-yard ſyſtem is, the cheapneſs of thus manuring land: The farmer will find, that he can in no other method manure at ſo ſmall an expence. All purchaſed manures come much higher, many of them five times more expenſive, in proportion to their value. In many ſituations there are no manures of any ſort to be purchaſed; in which the farmers, if they do not adopt ſuch a plan as I have mentioned, muſt give their land a poor chance; for it muſt be an admirable ſoil, or a moſt excellent courſe of crops, to render manure unneceſſary.

The compoſt raiſed the preceeding winter in the yard being carted out to the land, ſo ſoon in ſummer as the farmer has leiſure, he ought to begin to cart in the layers of turf, ditch earth, marle, or clay, upon which he is to fodder the ſucceeding winter. It ſhould be begun in June or July; his ſpring ſowing, ſecond turning of his ſummer fallow and turnip land being out of hand, this will be a buſineſs at hand, to prevent the team's ſtanding ſtill. It ſhould be executing from time to time till September, or the end of October. As the importance of it is very great, being the ſource of the moſt material improvements on a farm, it ſhould be reſolved on early, and executed with all poſſible ſpirit.

At the leiſure time of harveſt particularly, ſuch as the wet days, when the team cannot carry corn, and while all the

the harveſt men are employed in reaping and mowing, if the works of tillage do not require attendance, the horſes and oxen ſhould be kept to the earth-cart to form this bottom layer, the quantity to be in proportion to that of the dung, which is expected to be raiſed in the enſuing winter.

In November, when the winter is ſet in, the farmer begins to experience the conduct of the farm yard upon the principles already laid down. Let him obſerve to keep all his cattle confined; let none of them wander about the fields, when they can get nothing to eat; but if it proves wet weather, they will do much miſchief by poaching. Litter all the yards completely from the ſtacks of ſtraw, ſtubble, or fern; ſo that be the ſeaſon ever ſo wet, the cattle may not tread into the layer of marle-clay or earth at bottom, nor ever lie wet. As faſt as the litter is trodden into dung, or becomes quit wet, cut freſh ſlices down from the ſtacks, and ſpread it about. Have an eye to the horſe-keepers, that they uſe plenty of litter; and alſo that the fatting ſtalls, cow-houſes, ox-houſes, hog-ſties, be all kept quite clean littered; for this is the beſt and cheapeſt way of raiſing manure: And if you do not have a ſharp eye to the men, they will, to ſave trouble, be ſparing of the quantity; whereas the profit is ſo great on treading fern, ſtubble, or refuſe ſtraw, into dung, that no farmer ſhould omit ſeeing that all his cattle are well littered, to the degree requiſite for keeping them as clean as horſes in a ſtable are uſually kept. In wet weather the litter in the yards preſently turns to rotten compoſt, and ſhould be conſtantly repleniſhed. The urine of the yard ſhould all be thrown on the dung from time to time, and as little loſt as poſſible. Heavy rains will carry away ſome; but it ſhould never be without its having been thrown once or twice on to the heap, to ſtrain it thro' the earth at the bottom; for according to the principles of thoſe gentlemen, who have introduced this huſbandry, the earth retains

tains the ſaline and oily particles, and lets but little more than the plain water paſs through. But if it preſerves only a part of thoſe riches, the effect is a very valuable one, and ſhould occaſion the farmer being very attentive.

With a little management, all might be preſerved: The drains that carry off the overflowings of the yard, ſhould lead to a ſmall well with a pump fixed in it; this pump ſhould have a light trough, turning on a pivot, to receive the liquid; and a heap of turf, earth, or marle, be kept within reach of the trough, ſo as to convey the liquid over the whole heap, which being turned over from time to time, and carted on to the land, would prove a moſt excellent manure.

As the winter proceeds, a ſtrict attention ſhould be given to the cattle in the yard; thoſe I mean which run looſe in them. Take care that they are regularly ſupplied with ſtraw; and that they have always water at command. The threſhers ſhould be ſo proportioned to the ſtock of lean cattle, as to make the ſtraw laſt juſt through the winter. And from the ſtacks of ſtraw, ſtubble, fern, &c. raiſed in the autumn for that purpoſe, the yard ſhould be kept well littered, ſo that the cattle may always lie perfectly dry and clean. Their health requires this attention, which ſhould however be given, were it merely for raiſing large quantities of manure.

That this great end may be obtained, the Farmer, as the ſpring advances, ſhould conſider his ſtock of litter laid *in* in autumn; and if there is any ſuſpicion that it may not hold out, it is now time that he agrees with ſome neighbours for a weekly ſupply of refuſe ſtraw or ſtubble. At all events, do not let there ever be a want of litter either in the ſtalls or the yard; for this is the only way of ever raiſing large quantities of dung at a cheap rate.

After all this, will it be neceſſary to caution the farmer againſt diſpoſing or ſelling any of his own ſtraw or fodder. The farmer who does ſo is certainly in the high-road to deſtruction.

deſtruction. The induſtrious and attentive farmer will however never be at a loſs to purchaſe it from his neighbours: in no country will all men be alike attentive to their intereſt; and there will never be wanting ſome deſparate back-going farmers, who, for the bait of the price, or to help them at a dead lift, to pay their maſter's rent, or to buy ſeed-corn, will be ready to part with the greateſt part of the fodder in their yards, come of their cattle and grounds what will.

About the end of May or beginning of June, the farmer ſhould attentively conſider, if he will have a ſufficient bite of graſſes to leave off foddering entirely; and before that he ſhould not think of it; for if cattle are turned into graſs, not ſufficiently advanced in growth, they will require ſuch a number of acres, that the mowing ground for hay will be greatly curtailed.

As ſoon as your yards are cleared, the dung in them muſt be turned over and mixed carefully with the ſtuff beneath, whether it be clay, marle, turff, ditch-earth, or whatever elſe. For this purpoſe, you muſt ſet many hands to work on it, ſo as to get it done as expeditiouſly as you can; becauſe it ſhould lie a little after turning, before it is carried on to the land. It thereby undergoes a freſh fermentation, and becomes more rich and rotten. The method in which the men ſhould do this work is, to begin and throw the dung up againſt a wall, or into ſome vacant ſpace, ſo as to have the command of a trench to work in: They ſhould always keep this trench three or four feet wide; then they draw down with dung-cromes the dung, and breaking it to pieces with forks, throw it up on the part already mixed, in a ſpreading manner, ſo as to cover all the clay or earth. In this manner they proceed with the dung, to the breadth of about eighteen inches, or two feet, till they come to the ſtuff under it; all which they pull down with pick-axes or mattocks; and, when it is in the trench, break it further to pieces, ſo as to have it fine; that is, no pieces larger than a man's wriſt.

wriſt. If water hangs in any places in their trench, they ſhould have a water-bowl ready to throw it on to the part they have mixed. If this work is well executed, you will have a large hill of excellent manure, ready to lay on to the cabbage or turnip land, to be turned in by the laſt earth.

Reſpecting the quantity; therein lies the proof of your being a good farmer; perhaps, the moſt important, convincing proof that a farm can offer. If you have managed well, you will have from fifteen to twenty loads for every head of great cattle, and about ten loads for every hog, not reckoning pigs; not above a third of the whole marle or earth. Every truſſed load of ſtraw, trampled into dung, will make you ſix cart ones of dung, excluſive of any mixture. The loads I mention are large cart ones of forty buſhels.

But the earth, which has lain under the dung all winter, and received all the urine of the cattle, muſt by no means be reckoned as inferior to the dung itſelf. It is become a rich manure, without mixing with dung, richer than the beſt of marles: and I am well perſuaded, that this retention of the urine in it is of ſuch conſequence, that the whole compoſt, when well mixed together, will be better than if chalk or earth had been brought into the yard, at leaſt for moſt ſoils; but, that the favourable circumſtances of the conduct much exceeds the expence of it, for all ſoils, cannot for a moment be doubted.

ARTICLE. XVIII.

Of Compoſt Dunghills.

THE ſubject of the foregoing article is of ſo much importance in farming, and ſo fully treated, that little can be added to it. The publiſher, however, begs leave of the author of that Kalendar, who by that work approves himſelf a moſt excellent farmer, to obſerve, that the laying the whole earth, turf, clay, or marle, in the bottom of the yard

yard at once, will not contribute ſo much to enrich them by the ſupervenient dung, as if it was laid on in layers at different times, with layers of dung intermixed. Another advantage ariſing from this method, is, that if the farmer has acceſs to lime, a quantity of lime laid now and then along with theſe materials, will contribute greatly to divide and ſeparate them, and thereby to enrich the whole maſs in a much higher degree. And a third advantage is, that the whole will be very completely mixed all at once by cutting down and carting.

It may likewiſe be added as an appendix to this article, that the farmer ſhould erect ſtanding moveable racks in the middle of his yard, for putting the ſtraw or hay into, for feeding his cattle; and theſe ſhould be covered to keep the fodder dry. The form of them is known to every farmer.

But as many farmers are not provided with farm yards, the next expedient to be recommended to them is, the compoſt dunghill, which though more laborious, it is highly their intereſt to make, rather than uſe their dung by itſelf alone, which is moſt unprofitable and often pernicious. The ſociety of improvers in the knowledge of agriculture in Scotland give the following directions †.

Take, in the field intended to be manured, a head-ridge, the moſt conveniently ſituated for a midden. Plow it two or three times, as deep as can be, in the cleaving way, if the ridge be high gathered, and harrow it well: then lay thereon a layer of clay, about a foot thick, leaving a part of the ground uncovered: next lay a thin layer of dung, another of clay, and after that a layer of unſlaked lime, at leaſt a foot thick; then throw up the earth left uncovered on each ſide. After this, repeat another layer of clay, and lime as before, and finiſh it with a layer of clay and ſea-wreck, covered with earth. The more of the clay the better; for though it may be cold, yet it will not be the worſe for a ſandy hot ground.

† MAXWELL's *Collection, p.* 26.

After this midding has ſtood ſix weeks or two months, incorporating and fermenting, turn and mix it; and that this work may be performed to the better purpoſe, and with as ſmall an expence as poſſible, yoke your plough, enter upon your midding with a cleaving furrow, and continue repeating the plowings the ſame way, untill the very bottom of the midding be ripped up; then harrow it: it is impoſſible to over-do it. If it be very cloddy, it ſhould be harrowed between the plowings. Begin then in the middle, and plow again and again in the gathering way, until it be brought into as narrow bounds, and be raiſed as high as poſſible. Let all that the plow has left be gathered up, and thrown with ſhovels on the top. Every ſuch turning and heaping occaſions a new ferment, and improves the manure. If the ſeeds of barley, or of any other quick growing vegetable, were ſprinkled thin on the midding, and the plants buried in it, when fulleſt of ſap, before they come to ſeed, by turning or more heaping, the manure would be improved. This might be repeated often during the ſeaſon; for the practice has been found ſucceſsful.

In another place *, they obſerve, that ſuch a midden may be turned in the ſame manner as ground is trenched. The higher it is raiſed, the better. Each turning will make it heat like a garden hot-bed, and this fermentation will reduce it to a fine fat mould. If the firſt heat ſhould go off (which may eaſily be known by thurſting a pole into it) before it has produced this effect, it may be turned over again, and will take a new heat, which is of great advantage to it, beſides the better mixing of the ſeveral manures. About fifty or ſixty cart loads of this compoſt are uſed upon an acre of ground. Any farmer, by attending to the rules here given, may ſuit his compoſt to the nature of his ſoil. Where the ſoil varies, he will do well to have another midden, properly compoſed, in a convenient part of the field he intends to manure.

* MAXWELL's *Collection*, *p.* 136.

The ſame ſociety in their directions * for the management of ſheeps dung, where the ſheep are houſed, or fed under cover during the inclemency of the winter, adviſe laying under them ſubſtances ſuited to the nature of the ſoil intended to be improved. A layer of ſand, for inſtance, for ſtiff land, will be greatly benefited by being covered with a couch of litter in the ſheep-houſe. When their dung becomes troubleſome or offenſive to them, or begins to make them dirty, the whole ſhould be removed to the midden. But if the dung of the ſheep is to be laid on a ſandy ſoil, clay, or any ſuch ſubſtance, though covered with litter, it would ſoon become wet, and too cold for the ſheep to lie on. It would therefore be better, in this caſe, to ſpread a thick couch of litter under the ſheep, and mix this in the midden with the lime, &c. by which means the ſame advantage may be obtained, without injury to the cattle. If loam, or a rich mould, be laid under ſheep, the judicious farmer will be careful to collect a ſufficient quantity of it, when it may be got dry, in the ſummer. Whatever is uſed for this purpoſe, ſhould be removed as often as it is ſufficiently impregnated by the urine and dung of the ſheep.

The well preparing of mixed dung, is a piece of huſbandry by no means to be neglected; for the more and better the dung is, the greater will be the crop; and an increaſe of the crop will augment the quantity of dung. On the contrary, a decay in the dung makes a decay in the crop, &c. The riſe, or fall, of the value of many farms in this kingdom muſt therefore neceſſarily depend upon the good or bad management of this eſſential part of huſbandry.

Farmers, eſpecially if they live in the countries which do not abound in cattle, may be apt to aſk, Where they are to get ſufficient quantities of dung for the purpoſes thus ſtrongly recommended? M. de Turbilly, who pre-ſuppoſes this

* Interſperſed in ſeveral parts of Mr Maxwell's Collection, particularly in *p.* 159, 240, *and* 275.

this objection, anſwers it, by pointing out the following method of making an artificial manure *.

Before the winter ſets in, that is to ſay, by the middle of November at fartheſt, huſbandmen ſhould cleanſe all the yards, and out-lets belonging to the farm houſe, lay them ſmooth, and, if neceſſary, dig away a little of their ſurface, till it be about a foot lower than the floor of their buildings. Then, if they have any common, or waſte land, let them bring from thence fern, thiſtles, and other coarſe weeds, cut down when in full ſap, at which time they are beſt, or occaſionally as they are wanted, and lay a bed of them, about two inches thick, upon the places thus prepared. If weeds cannot be got, coarſe wheat or rye-ſtraw may be uſed in their ſtead, in beds about half as thick. A layer of earth, about ſix inches deep, ſhould be ſpread upon this bed of weeds, or ſtraw. Earth of a quality proper for the improvement of the ſoil intended to be manured, is undoubtedly the beſt; though any earth, which in this caſe the farmer will dig as near to the houſe as he conveniently can, is preferable to the miſtaken practice of paring off the upper ſoil, or turf, of the neareſt common or waſte land, to mix with the artificial manure: for when poor ground has loſt its ſurface or ſward, it long remains a barren ſpot, before a new ſoil, capable of affording root and nouriſhment for graſs, can be formed upon it. If no proper earth lies nearer at hand, the farmer may take off the ſurface of any part of his plowed ground which lies too high, and is not at too great a diſtance. But, as much as poſſible, he ſhould adapt the earth mixed with this manure, to the nature of the land for which it is intended.

This bed of litter and earth ſhould be let lie about a fortnight, during which all ſweepings and filth of the kitchen and houſe ſhould be thrown upon it, that nothing may be loſt, which can be converted into manure. The wetneſs of

* *Memoire ſur les Defrichements, p. 78.*

of the ſeaſon, and the paſſing of men, cattle, and carriages, over this bed, will greatly contribute to rott it; to complete which, let the farmer turn in all his cattle of every kind, and drive them backward and forward over it, after rain has fallen. This will ſoon render it a kind of coarſe mud mixed with litter, which may be cleared away at the end of another fortnight. If it be too liquid, as it often is in rainy ſeaſons, it ſhould be laid up in little heaps, upon the ſame place, till it be drained. Let it then be carried to a ſufficiently capacious hole, or pit, dug for the purpoſe in or near a corner of the farm yard. This pit muſt be in a dry place; for no manure ſhould ever be laid in water, which would waſh away its unctuous parts, deſtroy its heat, diſſolve its ſalts, and even leſſen its bulk conſiderably if it run off elſewhere. One load of ſtable and other dung ſhould be mixed with every two loads of this artificial compoſt, as it is laid in the pit. The next day, another bed of litter and earth may be ſpread in the yard, &c. as before; and, being managed in the ſame manner, will be fit for carrying to the dung-pit in about another fortnight. Thus two ſupplies of this artificial dung may be had every month, during the whole winter and part of the ſpring.

This work will not be expenſive: every body, even women and children may be employed at it, and it is done at a time of the year when labourers are leaſt wanted in the field. It may be continued in the ſummer: though the beds do not rot near ſo ſoon in dry weather; two or three months being ſometimes requiſite then, to bring them to a proper ſtate, in the above method. However, this may be conſiderably haſtened, and much improved, by bringing cattle to lie upon them in the night, unleſs they are in folds. The earth and other ſubſtances of this manure will be greatly enriched by their dung and urine, before it is carried to the midden.

As this laſt made dung will not be ſufficiently rotted by the next ſowing ſeaſon, the beſt way is to lay it in a ſepa-

rate

rate pit, to mellow, for the enſuing year; and it will be ſtill better, if kept two years. The other dung, made in a wetter ſeaſon, and more thoroughly putrefied at firſt, ſhould remain about ſix months in the pit, to ripen; and be wetted now and then in dry weather. During this time, it heats, ferments, and acquires an excellent quality. It may be made to ſuit any ſoil, and agrees with many lands better than pure dung taken from the ſtall or ſtable, than which it is milder, leſs fiery, and more laſting. Farmers who have not a large yard belonging to their houſe, may make this compoſt in any other place that beſt ſuits their convenience; and the poorer ſort of peaſants may do the ſame. By mixing with it a third part of other dung, they triple their quantity of manure.

There are two ways of meliorating land. One of them may be called natural and the other artificial. The former conſiſts in a well proportioned mixture of two or three different kinds of earth, the reſult of which is a new ſort, more favourable to vegetation; and the latter in dung.

Dung conſiſts of animal or vegetable ſubſtances, either actually putrefied, or in a ſtate of putrefaction. It operates two ways upon the earth: firſt, by conveying nouriſhment to the plants which grow in it, as the air and water alſo do; and ſecondly, by opening its pores and ſeparating its parts, by a kind of fermentation, till at laſt it is itſelf converted into a kind of fine black mould.

The only way to have plenty of this uſeful matter, without much expence, is by a mixture of ſtraw or litter with the excrements of animals. Manure may be obtained from every part of animals or vegetables: but a quantity ſufficient for a large extent of ground, would coſt too much. Saw-duſt, tanners bark, aſhes, ſoot, woolen rags, ſheavings of horn, &c. of which quantities can be had only in the neighbourhood of populous cities, are purpoſely omitted; and we have contented ourſelves with pointing out the means of encreaſing dung in countries diſtant from great cities.

ARTICLE XIX.

Of the nature and Uſes of Peat-Aſhes, and the ſeveral crops to which they may be profitably employed as a Manure.

From the Muſeum Ruſticum, Vol. I.

THE more general a manure is in its uſes, of ſo much the more value is it to the farmer; and, of all ſorts of manures, perhaps aſhes agree with the greateſt variety of ſoils and crops: aſhes *, therefore, ſhould, one would imagine, be had in univerſal requeſt, for the purpoſe of dreſſing land; but the misfortune is, no great plenty can be procured, and the few that are to be got fetch a large price: this deters the farmer from making uſe of them often as manure.

I muſt, however, except one ſort of aſhes, which are on all accounts valuable; I mean peat or turf aſhes: theſe are in moſt places eaſy to be procured, coſt no great matter, and have a wonderful effect on almoſt every ſoil and crop. You may believe what I ſay, as I have had many years experience of their good qualities.

The ſulphurous and ſaline particles with which theſe aſhes abound, have a moſt happy effect in promoting vegetation; and, if uſed with diſcretion, the encreaſe procured by them is truly wonderful.

I ſuppoſe few of your readers will be at a loſs to know what peat or turf is; moſt people have ſeen a kind of it burnt as fuel.

The ordinary peat is dug from wet bogs and moraſſes; but that which is of a much ſuperior quality and virtue in its aſhes, is dug from moory wettiſh lands which will bear cattle: as to the peat that is pared from the ſurface of heaths and

* All kinds of aſhes have their ſeveral degrees of excellence; yet ſome are much to be preferred to others; and perhaps peat-aſhes, on account of the quantity of ſalts and ſulphur they contain, are at leaſt as good as any.

and commons, for firing for the poor cottagers, the aſhes of it are of very little value, when compared with thoſe above-mentioned.

Peat is found in moſt low grounds that lie betwixt hills, eſpecially if timber has formerly ſtood on the ſpot. It lies at various depths, being often near the ſurface, and ſometimes ſix, eight, or ten feet deep, having a ſtratum of black moory earth over it, ſuch as is the ſoil of many of our low meadows near the banks of rivers: it ſometimes even lies under a bed of gravel.

Peat may be burnt for the ſake of procuring its aſhes for manure all the ſummer ſeaſon: As ſoon as it is dug, ſome of it is mixed in a heap regularly diſpoſed with faggot-wood, or other ready burning fuel: After a layer or two of it mixed in this manner, peat alone is piled up to complete the heap. A heap will conſiſt of from one hundred to a thouſand loads.

After ſetting fire to it at a proper place, before on purpoſe prepared, it is watched in the burning, and the great art is to keep in as much of the ſmoke as poſſible, provided that as much vent is left as will nouriſh and feed the fire.

Whenever a crack appears, out of which the ſmoke eſcapes, the labourer in that place lays on more peat; and if the fire ſlackens too much within, which may eaſily be known by the heat on the outſide, the workman muſt run a ſtrong pole † into the heap in as many places as is neceſſary to ſupply it with a quantity of freſh air. When managed in this manner, the work goes on as it ſhould do. It is to be noticed, that when once the fire is well kindled, the harveſt rain does it no harm whilſt it is burning.

Having procured a ſufficient quantity of aſhes, the farmer's next care ſhould be to apply them properly to uſe;

and

† This peat ſeems to be burnt much after the manner in which charcoal is made; though there cannot be ſo much delicacy neceſſary in the operation.

and to do this, he muſt be made well acquainted with the nature of the manure he is to lay on his land.

All aſhes are of a hot, fiery, cauſtic nature; they muſt therefore be uſed with caution. With reſpect to peat-aſhes, almoſt the only danger proceeds from laying them on in too great quantities at improper ſeaſons.

Nothing can be better than peat-aſhes for dreſſing low damp meadows, laying to the quantity of from fifteen to twenty Wincheſter buſhels on an acre: it is beſt to ſow them by hand, as they will then be more regularly ſpread. This work ſhould be done in January or February at lateſt, that the aſhes may be waſhed in towards the roots of the graſs by the firſt rains that fall in the ſpring.

If they were ſpread more forward in the year, and a ſpeedy rain ſhould not ſucceed, being hot in their nature, they would be apt to burn up the graſs, inſtead of doing it any ſervice.

It is to be remembered, that the damper and ſtiffer the ſoil, the more peat-aſhes ſhould be laid on it; but in graſs-lands the quantity ſhould never exceed thirty Wincheſter buſhels, and on light warm lands leſs than half that quantity is fully ſufficient.

On wheat-crops theſe aſhes are of the greateſt ſervice, but they muſt be laid on with the utmoſt diſcretion. Were they to be ſpread in any quantity before the winter, after the ſowing the corn, they would make the wheat too rank, and do more harm than good‡; was the ſpreading this manure, on the contrary, deferred till the ſpring, the corn could not poſſibly during the winter ſeaſon be benefited by it. After due reflection and repeated experience, my method of management in this caſe is as follows:

About the beginning of November, before the hard froſts ſet in, I ſow on every acre of my heavy clayey wheat

‡ This ſeems to be upon the whole a critical manure, but may with proper care be of great ſervice.

land, about eight Wincheſter buſhels of theſe aſhes; on my lighter warmer lands in wheat, I ſow only four buſhels at this ſeaſon.

This winter-dreſſing is, I imagine, of great ſervice: trifling as the quantity may ſeem, it warms the roots of the plants, brings it moderately forward, preſerves its verdure, and diſpoſes it to get into a growing ſtate the firſt fine weather after Chriſtmas.

About the latter end of February, or the beginning of March, on the above mentioned heavy lands in wheat I beſtow another dreſſing of aſhes, by ſowing of them on every acre eight buſhels more: on my light lands, in this ſecond dreſſing, I allow only ſix buſhels.

Theſe aſhes laid on in the ſpring are of the greateſt ſervice, without any probability of danger: if rain falls within a few days after the dreſſing is laid on, it is waſhed in and has a happy effect on the ſucceeding crop, co-operating with the manure that was laid on in November: if, on the contrary, dry weather for any long continuance ſucceeds, the firſt winter-dreſſing has its full effect, and the quantity laid on in the ſpring is in fact ſo ſmall, that there is very little probability of its burning or hurting the crop.

This method has ſucceeded very well with me, and I have no reaſon to think it can fail with any one elſe.

This excellent manure is, I find, of great uſe in the turnip huſbandry on many accounts; particularly as it much contributes to preſerve the young crop from being devoured by the fly *.

When I ſow my turnips, before I harrow in the ſeed I have eight buſhels of theſe aſhes ſtrewed by hand on every acre, and when the plants ſhew their firſt leaves above ground, I ſow on every acre four buſhels more: by this management my crops ſeldom fail, when at the ſame time ſome

* The hot cauſtic taſte of the aſhes may very probably render the young leaves of the turnips diſagreeable to the fly.

ſome of my neighbours ſow their turnip land three or four times over.

But one of the principal advantages derived from theſe aſhes I have not yet mentioned, which is the very great ſervice they are of to every kind of artificial paſture.

Saintfoin receives great benefit from this manure, and ſo does clover, ray-graſs, trefoil, provided it is laid on with diſcretion: the proper ſeaſon is about the month of February: the quantity muſt be regulated by the nature of the crop and ſoil; but, in my opinion, it ought ſcarcely in any inſtance to exceed thirty Wincheſter buſhels. Clover, with the help of this manure, grows with great luxuriance, inſomuch that I have often had two large crops of hay from the ſame field in a year, and good autumn ſeed afterwards.

But the effect of it is moſt ſeen in tares or vetches, and on them it is I beſtow moſt of this manure, as they will bear it, being a very ſucculant plant. I had laſt ſummer a crop of tare-hay that was aſtoniſhing, by the help of theſe aſhes, being above three large loads on an acre *. The field contained ſix acres; it was a dryiſh loam, and not very rich. In the beginning of February I cauſed ten buſhels, Wincheſter meaſure, to be ſtrewed on each acre: immediately after the firſt rains had waſhed them in, the ſame quantity was in like manner ſpread, and about the middle of March I beſtowed on each acre ſix buſhels more for the laſt dreſſing. I am fond of dividing my entire quantities, thinking my crops are thereby leſs expoſed to the danger of being burned, and the manure is beſides more gradual and laſting in its effects.

My tares came on amazingly, but they ran chiefly to haulm, which was what I wiſhed, not having any deſire of ſaving the ſeed, but intending to make the crop in hay: my only

* We ſhould imagine theſe aſhes would be of great ſervice as a dreſſing for buck-wheat, when it is intended to be plowed-in as a manure, becauſe the ranker and more luxuriant it then is, the better.

only fear was, that it would rot on the ground before it was in a proper condition to cut; but this I luckily eſcaped, by the ſoil being tolerably dry, and by the fineneſs of the weather. It was ſo heavy in the ſwarth, that I was obliged to pay an extraordinary price for mowing it.

I have obſerved above, that I was fearful my tares would have rotted on the ground before they were fit to cut: this was owing entirely to the invigorating quality of the aſhes, which by their ſalts, &c. promoted the growth of the plant even to luxuriance.

Before I well knew the great fertilizing quality of theſe aſhes, I loſt by improper management a fine three acre piece of hogs-peas. I laid on this field, ſoon after the peas came up, three ſcore Wincheſter buſhels of theſe aſhes at one dreſſing: this brought them forward a great pace, but at harveſt I found, to my grief, I had ſcarcely any corn, for I had over-done it in laying on ſo much, and the peas went run all to haulm*.

Ever ſince this accident I have declined uſing them as a common dreſſing for my peaſe; and this I have been the more induced to do, as, in ſeveral little experiments I have ſince made, I have found it extremely difficult to apportion the ſeveral quantities which ought to be laid on various ſoils when ſown with peas; for the quantity that has one year ſucceeded very well with me, has the next, owing to the difference of ſeaſons, on the ſame ſoil, in another part of the ſame field, totally diſappointed me: ſo that, for peas, I eſteem it a very critical manure, therefore very cautiouſly to be uſed.

The effects of this manure will be viſible at leaſt three years, and does not, like ſome others, leave the land in an impoveriſhed ſtate, when its virtues are exhauſted and ſpent.

Peat

* Peas rather require a ſweet ſoil unimpoveriſhed, having a natural fertility, than one greatly mended and enriched by manure.

Peat aſhes are not ſo certain a manure for barley and oats as for the winter corn; for as theſe are quick growers, and occupy the land but a few months, this warm manure is often apt to puſh them forward too faſt, and make them run too much to coarſe ſtraw, yielding only a lean immature grain. Oats, however, are not ſo apt to be damaged by it as barley.

To get a good crop of barley, I often ſow it after turnips, which have had too light dreſſings of aſhes, in the manner above deſcribed.

When the turnips are fed off, or drawn, I give the field, if the ſeaſon permits, a good plowing: if they were fed off, the land will want no more aſhes; but if they were drawn, and either carried into another ground to feed ſheep, or given to my ſtall fed oxen, I ſtrew on each acre, after this plowing, five Wincheſter buſhels of aſhes, leaving them to be waſhed in by the firſt rain. In this manner I let the land lie till I give it the ſecond and laſt plowing before it is ſown. The manure has by this management the deſired effect, and the barley generally produces full and heavy ears.

When I ſow my barley after turnips, I give the land only two plowings, becauſe the ſoil was before much looſened by the hoeings beſtowed on the turnips; but in other caſes I am fond of allowing three, and ſometimes four plowings to my lands deſtined for barley; and I generally find it anſwer very well; for many years experience has convinced me, that upon a fine tilth barley always thrives beſt, and yields moſt: in fact, the crop is almoſt always governed by the condition of the land, and a well-tiled ſoil is leſs expoſed to danger in an outward ſeaſon.

Peat-aſhes approach in their effects on the ſeveral crops on which they are laid, to coal-ſoot; but two thirds of the quantity that is uſed for ſoot, will be ſufficient of the aſhes, as they are, in a much ſtronger degree, impregnated with

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a vegetative power; and they are, beſides, in moſt places, eaſier procured in quantities, and at a cheaper rate.

It may poſſibly be objected, that this manure requires great nicety in the application: I allow it does; yet every intelligent farmer †, who knows the nature and qualities of the ſoils of his ſeveral fields, will ſoon be able, with great preciſion, to judge how much he ought to lay on each acre: his chief care at firſt ſhould be not to over-do it: for therein conſiſts the principal danger; though, after all, theſe aſhes will, at the worſt, unleſs laid on in very great exceſs indeed, only occaſion the inexperienced farmer the perhaps partial loſs of a ſingle crop; for the ſucceeding year they will, in all probability, have a very ſalutary effect on the land, and ſometimes even repay the preceeding loſs.

When the error is in the exceſs, it is very eaſy for a farmer to avoid falling into it; for, independent of every other conſideration, the ſole view of leſſening his expences will, it is imagined, ſufficiently induce him to be attentive to this particular.

When peat is burnt for the ſake of its aſhes in ſummer time, it is neceſſary that ſome care ſhould be taken to defend them from the too powerful influences of the ſun, air, dews, rain, &c. or great part of their virtue would be exhaled and exhauſted. If the quantity of aſhes procured is not very great, they may be eaſily put under cover in a barn, cart lodge or hovel; but large quantities muſt neceſſarily, to avoid expence, be kept abroad; and when this is the caſe, they ſhould be ordered as follows.

A dry ſpot of ground muſt be choſen; and on this the aſhes are to be laid in a large heap, as near as poſſible in the form of a cone ſtanding on its baſe, the top as ſharp pointed as poſſible: when this is done, let the whole be covered

† It ſhould ſeem, the farmer ought to uſe his manure at firſt with great caution, till repeated experiments have made him well acquainted with the nature and condition of his land.

covered thinly over with a coat of ſoil, to defend the heap from the weather: the circumjacent earth, provided it is not too light and crumbly, will always ſerve for this purpoſe.

When thus guarded, the heap may very ſafely be left till January or February, when it is in general the ſeaſon for ſpreading it; but, before it was uſed, it is always beſt to ſift the aſhes, that the cinders, ſtones, and half-burnt turf, may be ſeparated from them.

This may, perchance, by many be eſteemed an unneceſſary trouble: but experience, which is the beſt guide, has convinced me, that by this means I can better aſcertain the quantity that ought to be ſown on the ſeveral ſorts of land; for the ſmall powdered aſhes, being equal in quality, are of courſe equal in effect; whereas, when there has been any other mixture with them, the effect has often been greater or leſs than I could have wiſhed. Thus, when I mentioned the number of buſhels I ſtrew on an acre, it is always to be underſtood of ſifted aſhes: ſhould any farmer be inclined to try them rough as they are firſt produced after burning, the quantity to be for an acre muſt be more in proportion to the mixture of other matter that is in them ‡.

Theſe peat-aſhes are almoſt, as I have already obſerved, a general manure ſuited to every ſoil. On cold clay they warm the too compact particles, diſpoſe it to ferment, crumble, and of courſe, fertilize, and, in fine, not only aſſiſt it in diſcloſing and diſpenſing its great vegetative powers, but alſo bring to its aid a conſiderable proportion of ready-prepared aliment for plants.

On light land theſe aſhes have a different effect: here the pores

‡ The method of uſing them ſifted is certainly much to be preferred, as they muſt be more certain and equal in their operation. If the farmer is inclined to uſe the coarſe parts that are ſeparated in the ſifting, let him lay them ſeparately on ſome of his ſtiff land that is in fallow, where they may be of ſome ſervice.

pores are too large to be effected, or farther ſeparated by the ſalts or ſulphur contained in them; but, being cloſely attached to the ſurfaces of the large particles, of which this earth is generally compoſed, this manure diſpoſes them, by means of its ſalts, to attract the moiſture contained in the air: by this operation, the plants which grow on theſe porous ſoils, are prevented from being ſcorched up and burnt; and if they want, which they generalty do, more nouriſhment than the land is of itſelf capable of affording, this is readily and abundantly ſupplied by this uſeful manure.

In large farms it is very uſual to ſee all the home-fields rich and well mended by the yard dung, &c. whereas the more diſtant lands are generally poor, impoveriſhed, and out of heart, for want of proper manure being applied in time.

Whilſt the farmers depend almoſt intirely on their yard-dung, this cannot fail being the caſe; for dung is of very heavy carriage; they are willing, therefore, to drop it as near home as poſſible, being in this way able to do a great deal more work in the ſame ſpace of time: but would they once try the virtue of peat-aſhes, all their lands might be alike improved, though at a very conſiderable diſtance from the home ſtall; for ſo few of them are required and they are ſo light of carriage, that a ſingle tumbril will hold as many as ought, in moſt caſes, to be laid on two acres of land; by which means, when theſe aſhes are uſed as a dreſſing for the diſtant fields, it coſts the farmer leſs in carriage, than does that of the ſtable-dung for his home-fields.

THE SCOTS FARMER,

JANUARY 1773.

ARTICLE XX.

Of Water as an impediment to Vegetation—the methods of conveying away Water—the methods of draining Marishes.

Dickson's Agriculture, vol. I.

I. *Of Water as an impediment to Vegetation.*

IT has already been observed, that water is a necessary ingredient in the food of every plant; that some plants require a greater proportion, and some a lesser; and that altho' some of them cannot have too much of it, as it is the element in which they live; yet that others are chilled and destroyed by a small quantity.

It is proper now to observe, that the most useful plants cultivated in our fields, are of the kind that are destroyed by too much water. Such is the nature of our climate, that we have generally more water than is necessary. And, if this water is not conveyed away, it not only chills the growing plants, but also renders it impossible to prepare the land, on which it is allowed to stagnate, for the reception of seed. Hence water becomes an impediment to vegetation; and it is necessary to consider the most proper methods of conveying it away.

II. *Of the methods of conveying away Water.*

Before we consider what methods are most proper for conveying away water, it is necessary to inquire, what are the things that occasion our being troubled with too much

of it in our fields? For if the cauſes of the diſeaſe are known, it will be the more eaſy to apply the remedy.

Sometimes land is wet from its ſituation; is expoſed to overflowings from higher ground, and has no proper deſcent to allow the water to run off. When a great quantity of rain falls, it ſoon makes its way from the heights into the hollows, and there lodges, till it is exhaled.

Sometimes the bottom of land is of ſuch a nature, as to force out, in ſprings, the water that runs below the ſurface. Water runs in channels below ground. Sometimes it ſprings out, becauſe theſe channels, in which it runs, reach the ſurface; and ſometimes, becauſe it meets with an interruption in its courſe, which makes it force its way upward, and break out. When water falls upon land that eaſily admits it, it makes its way downward, till it is reſiſted by a bed of till, clay, or rock. If this bed has a declivity, as is commonly the caſe, the water falls along the declivity. If in any place this bed reaches the ſurface, or if the water meets with any interruption, there it breaks out; or if the ground riſes, and the bed riſes along with it, then the water breaks out in the hollow.

Sometimes the wetneſs of land is occaſioned by the ſeaſon, or climate, in which the rain is violent, and ſo frequent, that no time is allowed the land to dry. And,

Sometimes all theſe things may concur to render land wet.

The wetneſs of land from its ſituation may be prevented. The water, as it falls from the higher ground, may be received into drains, and, by theſe drains, conveyed away, and thus prevented from overflowing the land below. For although the land may be ſo low ſituated, as to render

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* Although we have aſſigned theſe reaſons for the wetneſs of land, yet it is certain that this chiefly depends upon the nature of the bottom. If the bottom is clay, till, or any ſubſtance that reſiſts the water, the land will be wet, whatever is its ſituation in other reſpects.

difficult to convey away the water that falls upon it; yet the water may be interrupted, in running from the higher ground, before it reaches the hollow, by a drain, at a place where there may be a ſufficient fall. If the higher ground is in tillage, the ridges and drains of it may be placed in ſuch a manner, as to prevent the water from coming down from it with violence; or the water may be directed, in its courſe, to channels where it can do little harm.

The wetneſs of land from the nature of its bottom, may likewiſe, in ſome meaſure, be prevented by drains. Land wet from the breaking out of ſprings, is generally upon a declivity. If the water runs near the ſurface, before it breaks out, it may be intercepted by a drain drawn acroſs the declivity, a little above the place where it firſt makes its appearance. And, if the channel lies deep, it may be prevented from running over the land below by a drain, drawn acroſs exactly where it ſprings up. In ſome caſes, it may be known, whether the channel of the water is near the ſurface, or lies deep. If the land is dry immediately above the place where the water ſprings out, it is an evidence that the channel of the water lies deep: if, on the contrary, the land is wet, even at ſome diſtance above the place where the water ſprings out, it is a preſumption that the channel of the water is near the ſurface. It would be a certain evidence of it, if there were no more ſprings but one. But if there are ſeveral ſprings, ariſing from water running in different channels, the land above the principal ſpring may be wet, not becauſe the channel of the water of this ſpring is near the ſurface, but by the breaking out of other leſſer ſprings, the channels of whoſe waters reach the ſurface, before that of the waters of the larger ſpring.

The wetneſs of land, ariſing from the climate or ſeaſon, is not to be prevented in the ſame manner, as that which ariſes from the other two cauſes mentioned. When land is wet, either from the overflowings of higher ground, or from ſprings, the water, by drains, may be intercepted;

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and thus prevented from doing harm. But when the wetneſs ariſes from the climate, or a ſeaſon in which there is too much rain, as is often the caſe, it cannot be made dry by intercepting the water. In this caſe, we can only remove obſtructions, and thereby allow it, as quickly as poſſible, to run away. Caſting drains in places of the field where the water is in danger of ſtagnating, will be of ſome uſe: But this cannot anſwer the end; for thereby no more is done than conveying away the water that would ſtagnate in the hollow; while nothing is done to convey it from the reſt of the field. And therefore, to drain land in this ſituation, it is neceſſary to lay it up in ridges properly placed, and to cut ſmall drains acroſs the ridges, where neceſſary, communicating with each other, and with the furrows, For, by this method, all the furrows betwixt the ridges become drains. The water, as it falls upon the ridge, immediately makes its way to the furrows, and along them where there is any deſcent; and, if it is ſtopped in any of them by the ground riſing, is conveyed by the drains acroſs the ridges, into ſome other furrow, where there is a deſcent, along which it marks its way off of the field.

Drains have been mentioned, as neceſſary for preventing or removing the wetneſs of land, from whatever cauſe it proceeds. There are two kinds of them uſed, open drains and hollow drains *. Hollow drains have ſome peculiar advantages. Being covered with earth, no land is loſt, and they are no impediment in plowing, On theſe accounts, they are preferable, in ſome

* Hollow drains are made by putting ſtones into open drains, covering the ſtones with turf, bruſh-wood, or ſtraw, and then throwing earth upon the top of all. It is neceſſary that the drains be made in ſuch a manner, that, when the earth is thrown upon the turf, or the other things by which the ſtones are covered, it muſt be of a ſufficient depth to allow a plough to go, without being incommoded.

ſome caſes, to open drains. But theſe advantages have made ſome perſons uſe them very improperly, and when they could be of very little uſe. In every caſe, open drains will anſwer the purpoſe of draining; and therefore are always to be uſed, when it is uncertain whether hollow drains will anſwer the purpoſe. Open drains only are proper for intercepting the overflowings of water from higher ground, and conveying away water that falls in rain. The reaſon why hollow drains will not anſwer theſe purpoſes, is obvious. The water being on the ſurface, cannot find its way to them: if they are on a declivity, the water will run over them, as it does over any other part of the field: and, if they are in a hollow, the water will ſtagnate even above them, and will be moſtly exhaled before any quantity of it reaches them. But hollow drains may be uſed for intercepting the water of ſprings: becauſe nothing more is required in this caſe, than to continue the channels of the water below ground to a proper place, where its breaking out can do no harm: for which purpoſe hollow drains are very proper.

Before we leave this article, it will not be improper to obſerve, that land is ſometimes wet from the nature of the ſoil.

There are two kinds of ſoil, that are much expoſed to be damaged by water. The ſoil in which there is a great mixture of clay; and the ſoil in which there is a great mixture of moſs. Experience ſhows, that both theſe kinds of ſoil take much longer time to dry than others that have received as much water, and are in the ſame ſituation.

We will beſt know how to render theſe ſoils dry, by inquiring into the cauſe of their wetneſs.

It is obſerved, that clay is a heavy body; that it does not eaſily receive water, but that it retains a large quantity, and will not eaſily part with it, when once received. It would ſeem, then, that clay has many pores, but that its pores are ſmall. Having many pores, it is capable of containing

taining a large quantity of water; but, its pores being ſmall, the water does not eaſily enter into it, or paſs through it.

It is obſerved, that moſs has ſtill worſe qualities than clay; for it not only retains a large quantity of water, but alſo eaſily admits it. It would ſeem, then, that its pores are large; but that it has a ſtrong abſorbent quality, or contains a great quantity of undiſſolved oil. The largeneſs of its pores eaſily admits water, and its abſorbent quality, or the undiſſolved oil which it contains, prevents the paſſage of the water thro' it.

It is obvious, that laying up ſuch lands in ridges, and caſting drains in proper places, though of ſome uſe, yet will not effectually remove the water; as the ſoil, from its nature, retains too large a quantity, and will not give it a paſſage into the furrows or drains, though there is a ſufficient deſcent. To drain ſuch land, it is neceſſary therefore, by culture to change the nature of it, and, in ſome meaſure, deſtroy its power of retaining water.

As the pores of clay are ſo ſmall, that water cannot find an eaſy paſſage through it; to drain this kind of ſoil, its pores muſt be enlarged. The methods propoſed, ART. III. § I. for enlarging the paſture of plants, ſeem to be very proper for this; frequent ſtirring, and the application of ſuch manures as raiſe a fermentation. Theſe operations open the pores, render the ſoil free and open, and thereby the water finds a more eaſy paſſage through it. The manures, particularly that are long in diſſolving, are the moſt proper; for, till they are wholly diſſolved, they keep the ſoil continually open.

Some perſons have obſerved, that clay has this bad quality; though reduced to powder, yet, when mixed with water, becomes as ſolid again as ever. As this is the caſe, though manures may help to make it part with the water, as they open the ſoil by fermentation, both in the time of

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the rain, and after it has fallen, yet frequent plowings can do but little ſervice; on the contrary, by opening the ſoil, make it receive the water more eaſily. It is therefore recommended to all perſons, who have this kind of ſoil to deal with, as a matter of the greateſt importance, to lay up the land, before the rainy ſeaſon comes on, in ſuch a manner, as allows the water the moſt eaſy paſſage, and expoſes it beſt to the influence of the winds. For thereby a great quantity will run off, and be exhaled, which otherwiſe would ſink into the land.

As moſs has its pores too large, and has an abſorbent quality, or a large quantity of undiſſolved oils, which prevents the paſſage of the water through it; to drain this kind of ſoil, it is neceſſary to leſſen its pores, render it more compact and firm, and, if poſſible, deſtroy its quality of retaining water. Frequent ſtirring, as already mentioned in the caſe of clay, and the application of ſuch manures as raiſe a fermentation, will leſſen its pores, and render it more firm and ſolid; and thereby prevent it from receiving ſo large a quantity of water. And the application of ſuch manures, as tend to make the moſs putrify, and to diſſolve its oils, will, in ſome meaſure, deſtroy its power of retaining water, and thereby allow it a more eaſy paſſage.

Sometimes it is obſerved that land is wet, though there is in it a great mixture of ſand or gravel. Theſe are kinds of ſoil which allow the water an eaſy paſſage, and are commonly very dry. When they are wet, this muſt be owing to the nature of the bottom. Clay, till, or ſomething that does not eaſily admit water, muſt lie near the ſurface. When this is the caſe, the land, though on a declivity, will be wet after violent rain. The water is eaſily admitted by the ſand or gravel on the ſurface; it is reſiſted by the clay, or till, in the bottom; and, though it deſcends along theſe, yet the abſorbent quality of the ſoil, and the other interruptions

ruptions which the water meets with, render its motion very ſlow. When land in this ſituation is on a plain, the qualities of the ſand and gravel can be of little uſe to render it dry. It is needleſs to propoſe drains in either of theſe caſes. The method of plowing is the only thing that can be of ſervice. Forming the ridges in ſuch a manner as to make many furrows, and placing them in ſuch a manner, as to make the furrows intercept the water, ſeems to be the proper way of draining this kind of land, when on a declivity: and the forming the ridges in ſuch a manner, as beſt to expoſe the ſoil to the influence of the air and winds, ſeems to be the proper way of draining it, when on a plain.

III. *Of the methods of draining Mariſhes.*

There are many mariſhes in Scotland. Some have been drained, and turned into very fertile land. The water which ſupplies theſe mariſhes ariſes from ſprings, which are obſerved commonly in great plenty at the bottom. The water of the mariſhes having no current, allows plants to grow from time to time. Theſe plants, with the earth waſhed down from the high grounds, by which mariſhes are commonly ſurrounded, and the duſt blown in by the winds have by degrees formed a ſpungy ſoil, which may be ſaid to float on the water. A ſoil, formed in this manner, muſt be rich; and, when drained, of great value.

To drain a mariſh, it is neceſſary, in the firſt place, to convey away all the ſtagnating water; and this water can be conveyed away in no other manner, than by a large open drain, with a ſufficient fall. This fall muſt be ſuch, as to carry off the water from the bottom of the mariſh, otherwiſe little advantage is to be expected from it. By conveying away all the ſtagnating water, ſome land on each ſide will be gained: for the water being removed, the earth, by degrees, will ſubſide, and become firm and ſolid. By this

this likewiſe the bottom will become firm; which will allow the drain, by degrees, to be carried forward through the middle of the mariſh. If the ſprings, by which the mariſh is ſupplied, ariſe near the middle; this principal drain, with ſome branches out from it on each ſide, where the ſprings are largeſt or moſt numerous, will be ſufficient. But if there are ſprings in all places, as is frequently the caſe, it will be neceſſary to make drains at the ſides, as nearly parallel to the principal drain, as the ſituation of the mariſh will allow, to intercept the water that comes from the heights, and ſupplies the ſprings. It will be neceſſary likewiſe, to make communications, by croſs drains, betwixt the parallel drains at the ſides, and the principal drain in the middle. All theſe drains muſt be kept open for ſome time. When the earth has fully ſubſided, and become firm and ſolid, then the drains upon the ſides, and the croſs drains may be turned from open into hollow drains: though it would be more proper, if the mariſh is large, to turn ſome of them into fences for incloſures. The principal drain, if the mariſh is large, ſhould always be kept open; and, though ſmall, ſhould not be altered, except the earth becomes quite firm, and there is a deſcent for conveying away the water as it falls.

ARTICLE XXI.

Of draining Grounds—Covered Drains—Open Drains—Water Furrowing.

THERE is not, in all the circle of a farmer's buſineſs, any thing more important, than keeping his lands dry, or that will more certainly make proper returns for the expences employed in it. At the ſame time, there is no part of his buſineſs, in which the Scots Farmer is more negligent. In viewing the country, one every where meets with paſture fields, themſelves of a good quality, but over-run with coarſe graſs and ſpratts, ruſhes, flags, and all the trumpery that proceeds from ſuper-abundant moiſture; whereby the paſture is greatly reduced, and if turned to hay, it is of little value, and ſmall in quantity: And there are few arable fields, but ſtagnating water is to be ſeen, ſoaking in the furrows, and ſpreading its influence even to the ſummit of the ridge; on which, notwithſtanding, the farmer, without conſidering the conſequences, beſtows his labour and ſeed, though in ſuch places he may depend upon having no encreaſe; which is truly "ſpending his money for that which is not bread, and his labour for that which profiteth not." For ſuch lands, while wet, can never be profitably laboured; they are too adheſive to plow, when kindlier ſoils have received their tillage and are ſown; and in wet ſeaſons, the crops are too trifling to pay expences. This is an improvement that cannot be too much impreſſed upon our Farmers; and therefore the directions of ſome other authors ſhall be added to what is ſaid in the preceeding article.

Of Covered Drains.

What is there ſaid, may enable the farmer to form a tolerable notion from what cauſes the wetneſs of his fields proceeds. If it is ſpooty or ſpewy, as it is commonly termed, and the moiſture ariſes from ſprings, the firſt attention

tention is to be beſtowed in examining the ſituation, to ſee if a ſufficient deſcent is to be found to carry the water clean off the ground; for till this is effected, it is in vain to begin the work. If there is, a deep drain or ditch muſt be cut in the loweſt part of the field, in order to gain a requiſite fall, to take the water clean away from the leſſer drains. Theſe again muſt be cut from that principal drain or ditch, to ſuch places as appear to be the heads of the ſprings, which will be known by their being wetter, looſer, and more boggy, than the reſt of the field. They muſt be cut deep enough to reach the bed, whether gravel or ſand, through which the water flows, and upon the firſt touching of this, the water will be found to run off more freely and in greater quantities, and the ground about will become drier and firmer.

There are two methods of making them; one by ploughs, which cut them either at one or various furrows; and the other, by digging with a ſyſtem of ſpades, which work one after the other, ſo as to dig a drain about four inches wide at bottom, and of various depths and breadths at top. If a farmer occupies land that has no ſtones large enough in it to obſtruct a plough, that implement is by all means adviſeable; for the expence of cutting the drains with a plough, inſtead of ſpades, is not near ſo great, as it may be done for a fifth part of the coſt. There are two or three kinds of draining ploughs invented, and may be had from London. But it ſhould be obſerved, that draining ploughs can only cut the ſmall drains; ſpades muſt be uſed for the main ones, or ſuch of the ſmaller or croſs drains, whoſe various courſe and ſuperior depth will require manual work. Suppoſe a large field drained by parallel cuts of a plough, ſtill the water muſt be carried out of thoſe cuts by deeper drains dug, unleſs the land has a regular deſcent: but whether the operation be performed by a plough at a ſmall expence, or by ſpades at a large one, ſtill the neceſſity of the improvement for

wet

wet ſoils remains the ſame; and thoſe who have had experience of their nature will not regret the expence of performing the work effectually.

If the ſoil is very wet, it will be neceſſary to cut the drains pretty near each other, by which means it will be laid in a moſt dry and wholeſome order. They ſhould be dug of various depths and ſizes, proportioned to the length, the wetneſs of the land, and the ſoil. The annexed ſcales [Plate I. Fig. 1.] are ſuch as frames ſhould be made by, for the men to work from; If the workmen have a frame of ſlit deal of ſuch ſhapes to draw after them through their work, they cannot commit miſtakes either accidental or willful. The dephths ſhould be varied ſufficiently to gain a deſcent for the water. They ſhould all be filled up with proper materials to the height of the line drawn, and then filled up to the top with earth acroſs them in the centre, by which the ſurface is again rendered level, and no part of it is loſt. They ſhould be left open for ſome time, until the quantity of moiſture abate, and the land acquire more ſolidity. The beſt time for covering theſe drains is about Michaelmas, the earth being drieſt at that ſeaſon, before the winter rains begin to fall.

In reſpect to the materials for filling up theſe drains, the farmer muſt be guided by the circumſtances of ſituation. If ſtones are to be had in great plenty, he ſhould fill with them, as being the cheapeſt, moſt durable, and at the ſame time ſerving to clean his ground. Above the ſtones, they ſhould be covered with turf, the graſs ſide downwards, or with heath, broom, ſtraw, or any other thing that can be had moſt convenient and proper to keep the earth from falling in among the crevices of the ſtones; through which, if no ſuch accident happen, the water will paſs eaſily, the drains will prove effectual; and the plough, after the earth that was turned out is laid above all, will go freely over without being oppoſed by the ſtones underneath. A foot depth of mould over the drain will be ſufficient

ficent in paſture grounds; but this covering ſhould be at leaſt a foot and a half in plowed lands. When ſtones are ſcarce, faggots made up of the branches of trees, bricks, horns, bones, ſolid turf laid in like a wedge, ſtraw, fern, ling, ſtubble, are all uſed in various places; but they do not anſwer the purpoſe ſo well, becauſe they are apt to decay and rot, the earth falls in, and the drains are ſtopped: but it would be highly proper, to line the ſides of the drains with bricks or ſtones without mortar, to keep the earth from falling in there, and at the ſame time give free admittance to the water. In Eſſex, where theſe drains have been uſed almoſt time immemorial, the farmers inſiſt, that the great object is not durability of materials, but the arching the earth when the materials are rotten and gone. In many parts of that county drains run well to this day, that were filled with nothing but ſtraw thirty years ago. The extending ſuch a practice ſhould depend abſolutely on ſoil; for moſt certainly there are ſoils, in which ſuch a practice would be totally inexpedient.

It may be almoſt needleſs to caution the farmer, that where a great quantity of water is to be diſcharged, the main drain into which the ſmaller drains are to empty themſelves, ſhould not by any means be filled up, even with ſtones, unleſs it be both very deep and very wide, and there be a great quantity of ſtones to throw into it, leſt it ſhould not be able to diſcharge all the water; in which caſe, the whole work will prove worſe than uſeleſs; a remedy being very difficult on account of the ſtones.

A late Engliſh writer ſays, that covered drains, dug thirty two inches deep, four inches wide at bottom, and twelve at top, and filled about ten inches deep, may be completely executed at 3*d* a perch or fall, where labour is 4*d. per* day in winter; if ſo, they may be wrought much cheaper with us, where labour is conſiderably cheaper. But the prices of the work will depend on the general rates of labour in the neighbourhood; in none will the expence

expence be any thing comparable to the profit: The benefit of theſe drains is immenſe; in many ſoils they are actually alone ſufficient to convert bad land into good, to more than doubling the rent. Whenever a wet ſoil is met with, I would on all accounts recommend to the improver, to determine immediately upon drainage, He can in no way lay out his money in a more judicious method, nor in one more certain of paying him. In many parts it is well known that the firſt arable crop has repaid the whole expence, which is a profit hardly to be reaped in any other article to which a man can attend. In wet ſoils, which are converted from arable to graſs, this improvement will be found of the utmoſt expediency; the graſs will come with ſurpriſing luxuriancy after this work. The number of common farmers, who execute ſmall quantities of it, ſhew plainly their idea of the profit attending it: here and there a great farmer, who has money ſufficient, drains his whole farm in this manner, at a conſiderable expence, and with a vaſt and certain advantage; which ſhows, that the only reaſon of the practice not being univerſal, is the farmer's inability of bearing the expence. This ſhould certainly induce the landlords to aſſiſt their tenants, ſuch as are induſtrious and willing to do well, with money at common intereſt to carry on and perfect ſo good and neceſſary a work: to demand a higher intereſt from the tenant, as the common practice is in Scotland, is uſurious and oppreſſive.

Suppoſe the land perfectly flat and very wet, and to require from fifty to ſeventy falls *per* acre, this, at the rate of 3 *d. per* fall abovementioned, for digging and filling, comes to 15 *s.* But ſuppoſing it double, though if the above account of the rate in England is juſt, it ſhould be a third cheaper, that will come to no more than 30 *s.* which is, 1 *s.* 6 *d.* of additional rent *per* acre; though in all probability the ſoil, with half that number of falls, will be near doubled in value. However without ſtating ſuch or any par-

particular inſtances, we may venture to aſſert, that this work of thorough draining, is of ſuch an excellent nature, and ſo eſſential to good Huſbandry, that an improver need not entertain the leaſt apprehenſion of being repaid his money with the moſt ample intereſt: he can expend it on nothing that will more certainly anſwer.

Of Open Drains.

Open drains have been mentioned, [page 151.] as only proper for intercepting the overflowings of water from higher grounds, and conveying any water that falls in rain; for which purpoſes hollow or covered drains are improper. It is impoſſible to give any particular directions either for the depth or wideneſs of them, becauſe that muſt depend upon circumſtances according to the quantity of water they have a chance to receive, and the quality of the ſoil. In all caſes they ſhould be of a proper width at bottom, and the ſides ſhould ſlope a little. But in light ſoils, which are apt to run, they ought to ſlope much more than in others. Some farmers of late have rejected covered drains altogether: from a conſideration of the expences, and the riſk of their choaking or filling up; and have betaken themſelves univerſally to open drains: theſe they make of the proper depth; but ſlope the ſides away ſo gradually, that a plough can go to the bottom of it, or a cart can paſs eaſily over: and by this means no ground is loaſt; for by making a deep water furrow in the bottom to contain the water, unleſs the quantity is the greater, the whole ſpace may be covered with corn and graſs. The earth thrown up is carted off, either to the general dunghill, or to compoſt dunghills made at the corners or ſides of the field.

Of Water-furrowing.

IN all arable fields, water-furrowing is an indiſpenſible duty. A great expence may be very fruitleſsly laid out in making drains if this is neglected, particularly in the autumnal

tumnal plowings; for the dryneſs and health of the land depends on the cutting them with judgment and ſpirit. Farmers are ſometimes backward in this point, in giving even their wheat crops fair play; but not one in twenty, where it is cuſtomary to plow up the ſpring-corn lands and fallows before winter, will be at the expence of doing them juſtice. This is a fatal ſaving, and attended with the worſt conſequences.

Make the plowmen, before they leave the fields, draw out the furrows in ſuch places as will beſt lay them dry; then the labourers ſhould with ſpades dig a ſpit out from the bottom of the furrow, and lay it on one ſide, ſhovelling out the looſe mould, and alſo paring down the ſides of the furrow, leaving it in neat huſband-like order. They ſhould with care open the furrows of the plowing, to let the water into it; and in general make it a rule, to leave the field ſo cut, that no water can any where lodge. Compared with the advantages of this practice, the expence will not bear naming. Many farmers are too apt to neglect the digging, only ſhovelling out the looſe earth left by the plough; but water furrows ſo carleſsly made preſently require deepening, and never anſwer the end deſigned with any tolerable ſucceſs.

In the ſpring, as the plowing advances, water furrows ſhould be cut through all the new plowed lands, as ſoon as the fields are finiſhed. Saving a trifle of money in the omiſſion of ſuch a neceſſary work, often hazards a crop, and is ſure greatly to damage it. In making them, have a ſure eye to the deſcents and variations of the ſurface, ſo that no water lodge in any part, however wet the weather.

The old furrows in the wheat fields, and thoſe in the fallows plowed in autumn, ſhould be carefully looked to: If they are filled in any places, by the crumbling in of the moulds after froſt, or by the paſſage of moles, or other accidents, let them be cleaned out; for too much attention

cannot

cannot be given to keep our lands quite free from ſtagnant water. Very ſmall ſavings in the omiſſion of this work, will be attended with certain and great loſſes.

In all new ſown lands, as ſoon as a field is finiſhed, let the ploughs, before they leave it, ſtrike the water furrows, and ſend in men directly with ſpades to ſcower them; that is, to throw out the moulds.

In lands ſown with clover or graſs ſeeds among the corn, they ſhould be dug a ſpit deep, and the moulds thrown carefully out. Many farmers are not attentive enough to this point; they only ſcower the furrows: but they ſhould conſider, how long the graſs is on the ground, which probably may be two or three winters; and conſequently it muſt be very material to the crop, to lie dry all that time, which ſcowering alone will not effect.

Here it may be proper to take notice, that where ground lying in a declivity is either ſubject to ſprings or ſupervenient water, it is adviſeable to plow them nearly in a horizontal direction, ſlanting along the declivity; by which means each furrow carries off the water, which otherways would ſink into the next ridge. If the clay underneath lie at ſo ſmall a depth that the plough can reach it, this will have a very good effect: And as the nearly horizontal direction of the furrow, gives the water but a ſlow motion, it will not be ſo apt to waſh away the richer mould, as it would, if the furrows were more perpendicular to that direction. Theſe furrows ſhould however have ſlope enough to give the water a current, ſufficient to prevent its ſoaking into the ridges underneath.

ARTICLE XXII.

On Summer-Fallowing ground—The advantages and different methods of Fallowing *.

SUMMER FALLOWING is, a reſting of the ground, or ſuffering it to lie idle and free from producing of a crop for the ſpace of a whole year; during which year of reſt, it is plowed up at ſeveral ſeaſons, and in the manner pointed out in this treatiſe, in order to repair the waſted and wearied earth with freſh mould, which remaining for ſo long a time expoſed to the influence of the weather, is thereby becomes impregnated; and by the propagation of freſh ſalts, the mother of corn, and all other vegetables, it is rendered fitter and better qualified for the production of

* This Treatiſe was firſt publiſhed at Edinburgh in 1724, by the Honourable Society for improving in the knowledge of Agriculture, under the title of "A Treatiſe concerning the manner of fallowing of "Ground, raiſing of Graſs-ſeeds, and training of Lint and Hemp, for "the increaſe and improvement of the Linen-manufacturies in Scot-"land; publiſhed for the benefit of the Farmers in that Kingdom." In the Introduction, the following account is given of the Society itſelf, and of the deſign of the treatiſe.

"We ſeem at preſent to be in a very proper ſeaſon for purſuing "theſe advantages; we are at peace with our neighbours abroad; "we are free from inteſtine troubles and confuſions; the management "of public affairs is confined to a few hands; our commons are not "preſſed into the wars, nor the main body of our gentry called from "their own homes, to attend at the ſeat of government; ſo that we "neither want hands to work, nor heads to direct, if we would but ſeri-"ouſly apply our endeavours to theſe purpoſes. It is for the advance-"ment of theſe laudable ends, that ſo many perſons of diſtinction "have formed themſelves into a ſociety, with a view to promote the "advantages of their country, in a manner neither attended with too "much charge, nor expoſed to envy: Their intention is to promote a "general good, and in a more particular manner to aſſiſt the honeſt "endeavours of every well diſpoſed country Farmer: For this purpoſe, "they have not only been ready, from time to time, to communicate "their obſervations, by anſwering the queſtions, or reſolving the "doubts

of new crops. And this is neceſſary to be done every fourth or fifth year, as the different kinds of ſoil ſhall require. The advantages which ariſe from this practice, are, *Firſt*, That the earth is refreſhed, and the ſalts renewed. *2dly*, By frequent plowing, the weeds and trumpery, which give ſo much diſturbance to the huſbandman, impoveriſh his ground, and leſſen his crop, are entirely deſtroyed; and inſtead of harming him, are made profitable; for, by being plowed down, they come in place of dung to his ground, and give him an addition of ſalts. *3dly*, In place of weeds which incumbered his ground, he is ſupplied with more plentiful crops of corn than formerly.

The

"doubs which have occurred to particular perſons, in their ſeveral at-
"tempts towards improvement, the uſefulneſs and advantages of
"which, they hope, a little time and experience will juſtify; but they
"have alſo been at pains to provide, at their own charge, models of
"ſuch inſtruments of huſbandry, which have been found upon trial
"much to abridge the trouble of the labourer, and are not as yet com-
"monly received or made uſe of amongſt us, from whence, they that
"are diſpoſed may have an opportunity to provide themſelves at a very
"ſmall expence. They have further thought it incumbent upon them,
"to offer the following directions contained in this ſhort eſſay, to
"ſerve as a guide to thoſe who are already entered upon a courſe of
"improvement, and to undeceive thoſe who are inclined to deſpiſe
"new methods; hoping to engage them, from the proſpect of their
"own advantage, to put theſe leſſons in practice, from whence others
"have already reaped ſo great benefits.

"The following ſheets being chiefly calculated for the uſe of the
"common farmers, are therefore delivered with the greateſt ſimplicity
"and plainneſs, being not ſo much intended to divert as to inſtruct
"the reader: And in regard the practice of Summer-fallowing of
"ground (which is the ſubject of the firſt chapter) has been much ne-
"glected by ſome, and even argued againſt by others as unprofitable;
"it is thought neceſſary here to premiſe a ſhort deſcription of the
"thing itſelf, with a view of the benefits ariſing from it; and alſo
"to obviate or anſwer theſe popular topicks or objections made uſe
"of, by perſons not ſufficiently appriſed of their own intereſt, to diſ-
"courage men from the practice of it."

The only objection which the generality of our farmers have to this practice, is, That they are poor, and cannot forgoe the want of a crop, and one crop cannot be expected to make up the loſs of two.

In anſwer to this, it ought to be conſidered, That this very method is propoſed as a remedy to their poverty; and they are not to give over or be diſcouraged, becauſe one crop after fallowing, does not yield them ſo much as two would have done without it: No, it is not the return of one year that is to make them up, but they are to regard the profit ariſing from the whole; for, by experience, which is the countryman's ſureſt guide, it is found, that in two or three years after fallowing, there is a greater increaſe upon the whole, than could have been expected in a year longer without fallowing; and by this method the ſtrength of your ground is increaſed; it is laid down in better heart, and conſequently bleſſed with a great increaſe; whereas, by the ordinary practice, it is daily waſted and decayed, except the firſt year of dunging.

To illuſtrate this the better, let us take an example of the product ariſing from both methods. The generality of farmers, who follow the common courſe, reckon it good increaſe, upon their beſt infield ground, after dunging, to have the ſixth corn, the ſecond year the fifth, the third and fourth years the fourth; and, if it runs longer, the third; but it ſhall be ſuppoſed that the three laſt years yield the fifth: by which calculation, the product of one boll, is in four years twenty-one; from which, the ſeed being deducted, there remains of neat increaſe, ſeventeen bolls. Take the ſame ground and ſummer fallow it; it is known that ſeverals have had above the twelfth corn: but ſuppoſe it only yield, as it may well do the firſt year, the eighth, the ſecond and third years, the ſeventh corn, you ſhall have after one boll's ſowing in the courſe of three years twenty-two bolls increaſe; and the ſeed being deducted, the neat produce is nineteen: So that by this rule, he who fallows

his

his ground has an advantage of two bolls in the courſe of four years, after one boll's ſowing, notwithſtanding the loſs of an entire crop: ſo that in a farm of thirty bolls ſowing, the farmer that fallows his ground will have ſixty bolls increaſe, beyond the other who does it not, with this further advantage, that the fallowed ground will be daily improving and growing better; whereas that which is unfallowed, muſt be waſted and decayed by conſtant tillage. And as this difference will be found in the very beſt grounds, the benefits ariſing from this method will be greater and more ſenſible in weaker grounds: In theſe it is reckoned good produce to have, in the ordinary way, four after one; ſo that, in four years, the neat increaſe of one boll's ſowing, the ſeed being deducted, will be twelve: Now, by fallowing, the ſeventh, or at leaſt the ſixth corn, may be depended upon; by which, taking it at the loweſt eſtimate, you have of clear produce in three years, fifteen bolls: So that, by this calculation, the farmer that fallows his ground, ſhall after thirty bolls ſowing, in the courſe of four years, have an increaſe of ninety bolls at leaſt, beyond what the other will have who follows the ordinary courſe. And this, it is hoped, will be ſufficient to take off the objection, and to give a proſpect of an abundant recompence for all the extraordinary pains and labour which fallowing requires; eſpecially when it is conſidered, that the increaſe abovementioned, as ariſing from the ordinary method, is reckoned to the full; whereas the produce after fallowing, will appear to thoſe who have experienced it, to be but very indifferently ſtated, in compariſon of what, in reality, it will yield.

Summer fallowing in general, being eſteemed by all skilful huſbandmen, the greateſt improvement for grounds to be uſed in propagating of corns; we ſhall proceed directly to the different manners of fallowing for different grains, and different grounds.

And

And therefore, *Firſt*, As to ſtrong clays, it is generally thought a winter-furrow is abſolutely neceſſary, and this is to be given in countries where they fallow their bear-land immediately after harveſt; and then they plow their oat-grounds. After all that neceſſary work is over, give your fallow the firſt furrow any time in winter; give it its ſecond in the latter end of May; if it is to have four furrows, which you'll be able by that time to judge, by its being peſtered by much graſs, the greateſt enemy of all to corn, and ought therefore carefully to be deſtroyed: for this end you muſt cleave the ſecond furrow, which ought always to be as deep as the ground will allow, and let it lye to the end of June, or beginning of July, when you are thoroughly to harrow it, at leaſt ſo far as to make the cattle that's to labour it, to go eaſy and ſmooth; then you are to croſs-plow it, by which means the ground is ſo broken, that the graſs, in the ſummer ſeaſon, if tolerably dry, will die, and what remains will become ſo weak, that it will eaſily part with the ground in harrowing, which is to be done before you give it the ſeed-furrow, and then to lay on your lime or other manure for the enſuing crop.

There is another method of managing clay grounds when clean, and grounds that have been in uſe to be fallowed in their courſe: The firſt furrow they commonly get, is betwixt the oat-ſeed, and the making of the bear ſeed, which is ordinarily ſome time in March, if the ſeaſon proves good. Fallowing, that is thus long of getting its firſt furrow, ought by all means to have it dry, which produces two advantages; namely, That that ground, dry plowed, winds and rots as they call it; the weeds thereby conſume; and what ſeeds of them are in the ground grow freely, and are deſtroyed by the ſecond plowing; ſo that by that means the root and ſeed of the weeds are killed. If the ſeaſon betwixt the oats and bear ſeed is neglected, the next ſeaſon is after bear-ſeed, about which time the ground turns ſo hard that it is not to be got plowed; and much depends on the firſt plowing

plowing, becauſe of the ſeaſons turning drier and drier; for what is miſſed in the firſt plowing, generally ſpeaking, is hard to be hit in the ſecond. The ſecond plowing of this ground is to be given in the drieſt time of ſummer, and the third or laſt furrow to be given in the month of Auguſt, before the harveſt comes on. When your middle furrow is cleaved in the end of June, or beginning of July, your dung ſhould be laid on before the laſt furrow, which is given in Auguſt: The reaſon of giving your furrow in Auguſt before harveſt, is, that ſo much of your winter work may be over; the ground ſettles and grows firm before ſowing, and, if your grounds lie low and wet, they ought to be early ſown, that your grain may be early up and well ſtooled before winter, and ſo be able to defend itſelf againſt the moiſture; and you cannot employ the dewy mornings and rainy days of harveſt to better purpoſe, than in ſowing the wheat, when your ground has been ſeed-furrowed in Auguſt, as before directed.

In your dry-lying grounds, you need not be in ſuch haſte; ſowing in the end of September or beginning of October will do very well: In harrowing of your grounds dreſt after this manner, and of the ſoil above deſcribed, beware of harrowing too fine; but leave a good round mould as they call it, which protects the tender grain in its firſt riſing, and during the winter ſeaſon, which inſenſibly moulders theſe ſmall clods; and has the ſame effect upon wheat, as hoeing up the earth on peaſe and turnip; and when rolled with a roller in the ſpring, is of great advantage to cover and ſtrengthen the roots, which may happen to be looſened by the froſts.

It is to be obſerved, that ſtrong clays in heart are not eaſy to be over plowed. You are likewiſe to be careful that no water ſtand on your ground or furrows, but that proper drains be made to carry it off; and this is not peculiar to clay, but requiſite to all other ſorts of grounds; in regard water not only deſtroys the grain that is ſown,

and

and loſes the advantage of your manure, but encourages graſs, which ſometimes overgrows the whole field.

The rules ſet down for the firſt fallowing by four furrows, is only neceſſary where the ground is over-run with graſs, or other weeds, that are hard to be got out, and are very hurtful. The ſecond way will be proper, where the ground is not very graſſy and is pretty clean; this management is for wheat, the next crop to be peaſe, the next barley, the fourth commonly is oats, and then they fallow again; but the farmers in Eaſt Lothian, moſtly from their experience in clay grounds, find the crop of oats ſo indifferent, that they chuſe to throw out oats, and have the whole labouring ground in four breaks, and fallow after the barley, and thereby take only three crops; upon the matter, you will find your three crops of wheat, peaſe, and barley, and one fourth lying fallow, afford you more than when you have four breaks, and one fifth lying fallow; and your ground when in four breaks will be always cleaner, becauſe oftner fallowed,

When you ſow peaſe after wheat, if you could burn the ſtubble, or otherwiſe deſtroy it, you would be more certain of your peaſe; for when wheat ſtubble is rank, it is apt to keep the ground open, ſo your peaſe are liable to the inconveniency of lying too hollow, and more expoſed to froſt and drought; wherefore, it is thought that wheat upon fallow, on which you are to ſow peaſe, ought to be cut as cloſe to the ground as poſſible, by which means you will have more fodder, and conſequently more dung to help and aſſiſt your fallow; otherways plow it down as ſoon as you carry off your wheat, thereby to rot the ſtubble, which will ſerve inſtead of a little dunging: If your peaſe ſucceed, they meliorate and rot the ground, ſo that you may depend upon your third crop, which is barley, which will need no more than two furrows in this method of labouring; by which means you avoid the danger of a wet ſteering time, and ſave your horſes when they are at the loweſt, which is a conſiderable

derable advantage. The ſame method will ſerve for grounds that are more of a clay than a light nature.

The next to be conſidered are light grounds, on which ſometimes wheat is ſown: the ſpring furrow is the beſt way for theſe grounds; they are not in danger of being too dry and hard; and therefore you are maſter of plowing them in any time of ſummer, nor are they apt to be ſo plagued with couch-graſs as clay grounds, nor need they ſo much plowing. Theſe grounds are very apt to be over-plowed, and are liable to a misfortune, which the country people call Harrow ſlaying: Three furrows, commonly ſpeaking, are ſufficient for ſuch grounds; and they are to have no more if they run not to weeds, which ſometimes happens, but they ought never to be ſuffered to come to flower; and ground is always to be plowed when weeds ſpring high, and the ground well grown, as it is called, which is eaſily prevented if the three furrows are given with underſtanding; for no doubt every ſuch over-growth of trumpery and weeds waſtes the ſalts, and conſequently in proportion weakens your ground.

There is a late practice in ſome places in England very much approved, which in a few years may become univerſal; that upon all their fallow grounds, they ſow their firſt crop barley or bear, and after that wheat, the third peaſe, and fallows down to the fourth, and repeats the ſame grain. And the reaſon of this is plain and obvious; for becauſe the wheat being ſown in autumn, the greateſt care taken cannot deſtroy all the ſeeds and trumpery, but leſs or more in two ſeaſons will ſpring, and ſome come to ſeed, eſpecially the popple, and graſs ſeeds, ſuch as gooſe corn, dornal, &c. which are commonly the cloſe attendants of wheat. On the other hand, the ſeed and weeds are firſt deſtroyed by the ſummer fallow; and if they ſet up their heads with autumn and ſpring rains, and are not killed by the froſt, the plough does it in the advanced ſpring, and ſets them at leaſt a ſeaſon behind, and can never diſturb the barley.

Then again, the barley delights in a free open ground, and keeps it ſo, as you will perceive by its roots; and being a ſhort while in the ground, the wheat after binds and brings it to firmneſs, by the ſtrong roots which it leaves, and abiding with it two ſeaſons; ſo that by ſowing the barley, the field is better fitted and prepared for wheat than otherwiſe. In places where they can command dung, they take only two crops, bear and wheat, and fallows down the third, becauſe theſe grains afford moſt; and in lighter grounds and remote from manure, they content themſelves with two crops, barley or bear firſt, ſecond peaſe, and fallow down to bear again.

All that has been ſaid above, regards only Croft or Infield Ground, as commonly termed: Not but all may be tried upon ſtrong outfield, and brought in place of infield, which perhaps as richer, you may chuſe to lay down for hay or graſs; but the outfild muſt for certain be well dunged and limed, or both if you can ſpare it; or burnt and limed, firſt plowing, which anſwers in ley as well as in moſs and clay grounds are alſo ordered that way to advantage. The method for burning is this; after you have tirred the ground by a ſlaughter ſpade, or breaſt-plow, or, to ſave men's labour, with a plough and horſes, cutting the ground with the coulter of a plough without the ſoak; and then croſs cutting it with both coulter and ſoak; and when the turfs of moſs, or clots of clay are ſufficiently dry, let the ſame be gathered in ſmall heaps; and if need requires, for the better executing of this, you may have ſome dried whins, broom, or other fewel, to be mixed in the heaps for the readier firing them: but carefully obſerve in burning, never to allow the heap to go to a flame; but as you perceive it to break out, to cauſe cover it with new turf for the ſlower you burn it, and the more you ſtifle the flame, you ſhall have the more aſhes, and conſequently the more ſalts: After being burnt, having ſtood ſome time let the clots and aſhes be ſpread in a calm day after rain

equally as may be; and let the places where the heap od be paired clean; and at the ſame time ſpread thirty forty loads of lime upon each acre; and plow it before e winter rains, with an ebb furrow, if you deſign to ſow with winter grain: But if for a ſummer corn crop, it uſt be plowed with a pretty deep furrow, whereby the ne and aſhes being deep covered, will be leſs liable to be aſhed off with the winter rains; and the mould that is rned uppermoſt will be ſweetned and meliorated with the nter froſts and ſnows. In the ſpring, about the beginng of April, let it be plowed again, of the ſame deepeſs as formerly, that ſo the lime and the aſhes may be rought up to mix with the other mould, and this may be ne in narrow ridges, not raiſed very high: And ſow rley or oats as you think proper.

There is no great advantage in fallowing of moſſy rounds, where the moſs is deep, unleſs you deſign to bring to a better and ſweeter ſward of graſs, by burning the me that year of the fallow, and taking only one or two rops, and to lay it down with graſs ſeeds; and even in this ſe you are to avoid burning and tirring of the whole oſs: For which purpoſe follow this method; take one f the Denſhyring plows, which is with a broad flat ſock, nd a wing out from it, the wing for cutting the turf, nd the ſock for laying the graſſy part over; and, as you us lay over three, four, five or ſix furrows, which we uppoſe will be two or three foot broad, then you are to ve the like breadth next to it without plowing; ſo that y this means the half of your field will be only plowed, nd the other half in graſs. Thus done, you are, about iddle of ſummer, and when the furrows and moſs are ry, to cauſe cut the ſaid turf in the lengths of two oots or ſo; place part of the turf upon the graſs ground, nd put fire to the whole, if they'll burn without putting them in heaps; but if not, lay them in heaps, ear a cartful in bigneſs, and obſerve the method of burning

burning and ſpreading the aſhes, as above directed, with this alteration, that you throw above two parts of them upon the green ſurface, the third being ſufficient to ſerve the plowed ground: Becauſe it is to be ſuppoſed that a good deal of the plowed moſs will be burnt and heated underneath. Immediately after this, which will be about Auguſt, give it a narrow ordinary furrow, as well the ſurface you ſaved, as that which you burnt, and let it lye all winter as dry as poſſible; and early in the ſpring, in a dry time, give it a croſs plowing, with a narrow ebb furrow, the better to mix the moſs and the aſhes together; and immediately thereafter ſow oats ſomewhat thinner than uſual; and give your oats a good harrowing to ſmooth it ſufficiently; and in two or three days thereafter ſow your field with rye-graſs and clover, as directed in the next chapter. But if the moſs is ſhallow, and of a fenny nature, and a clay ſoil below, there is no better improvement can be, than by burning the whole, and ſummer fallowing and plowing up the clay to mix with the aſhes: And this will prove a laſting field either for corn or graſs.

Obſerve, in laying on either lime or dung, or laying them on jointly together, which, by experience, is found to be the beſt of all manure, lay on no more on your ſeveral ſorts of grounds above-deſcribed, than what you can plow in two days at moſt; becauſe, if rain overtake you before the lime is plowed in, it is apt to ſuffer very much by it; and if dung, to waſh away. The dung and other manure ſhould be laid on before the laſt furrow, which is given in Auguſt. Some lay it on the ſecond furrow, ſome on the firſt, after harrowing with the break harrow. And the obſervation ariſing from that, is, That the ſooner the dung is laid on, the more it incorporates with the ground, and exerts itſelf more the firſt crop; but is ſooner exhauſted and waſted. And take the following direction how to prepare your middens and dung-hills after the eaſieſt manner.

Take

Take a head-ridge of your ſtrongeſt clay or beſt ground, plow it once or twice as deep as poſſible; and after you have harrowed it ſtrongly with your break harrow, carry out and lay along it a ſtratum of your horſe and cow-dung, about half a foot thick, leaving on each ſide five foot of earth or thereby; then carry out ſhell-lime burnt, and lay it above the ſaid dung, of the ſame thickneſs; and above that lime, throw up the five foot of earth you left on each ſide to cover the lime; which, with its natural moiſture, will ſoon ſlacken the lime, and preſerve all its ſtrength. Thereafter repeat another ſtratum of dung, with another of lime, and carry earth above all. In caſe you have no lime, take ſea-ſhells, ſea-ſand, ſcouring of ditches, clays, &c. and mix with your dung. After your dung-hill has ſtood, and fermented about two months, take a plough and go thorough it five or ſix times, and harrow as aforeſaid, and cauſe your ſervants gather up the ſides of it with ſhovels. If you are to make uſe of it to winter corn, ſuch as wheat or rye, you may repeat the plowing and harrowing once more: But if it ſtands to the ſpring, let it then be amongſt the earlieſt of your works: When you come to carry it out, it will part and ſpread as well as pigeon dung, and you may carry off from the head ridge all the earth, as deep as the plough went, which will be as good as any of it; ſeeing that the ſalts of the dung, by lying ſo long on that place, will have pierced a good way down. And all the dung hills you make about your doors, will be the better of being mixed as above.

Now, that we are upon manure and dungs, it is not improper to ſay ſomething upon marle, though little uſed in this country, and but few pits of it diſcovered: Of which there is two ſorts, ſtone and clay marle; and is no other than a finer ſpecies of clay, and of as many different colours. Very often it is found in meadow grounds, and upon the brinks of rivers and brooks. The ſtone marle, when expoſed to ſun and rains, ordinarily falls down in the

the ſhape of dice, is often found among coal, and, generally ſpeaking, both kinds lye in four wet ground. The beſt method to know its richneſs and goodneſs, is by the freeneſs of its parts, and ſlimieneſs in your hand; or by putting a piece of it, when dry, in a glaſs of water, and if with the water it crumbles and falls, it may be reckoned good: By the bottom of the glaſs you will diſcover what ſand it contains, which you will likewiſe know by taſting it in your mouth; and that is the richeſt and beſt marle that has the leaſt ſand.

There is no dung or manure upon earth comparable to marle, when rightly adapted to the ſoil; being wonderfully good for all ſandy ground, and light weak ſoils; but not for clays; conform to the ordinary rhymes.

If you marle ſand, you ſhall buy land;
If you marle moſs, you ſhall have no loſs;
But if you marle clay, you throw all away.

The way to manage it, is, that when it is digged, you carry it out in carts, and ſpread it equally upon your field that you fallow, or in the ordinary way of plowing, or upon your lee-ground; and let it lye expoſed for the ſpace of half a year to the dews, rains and froſts, in order to mellow: And although it ſhould even then appear not to be diſſolved, but to ſtand in the ſhape of cakes or big pieces, yet you'll find, that upon touching them, they will fall down and moulder; wherefore it will be neceſſary that you harrow well your field, and thereafter plow it, ſo as the marle may incorporate with the earth. The quantity to be laid on upon an acre cannot well be determined; that muſt be adjuſted according to the nature of the ground, and ſtrength of the marle; but, at leaſt, it muſt be laid on an inch thick, or a little more, if you expect profit.

As this manure is the richeſt of any, ſo it is by far the moſt expenſive; but no man ought to grudge it, in reſpect it

it will continue to bear good crops, for the ſpace of eighteen, twenty, or twenty-four years, provided you give that ground the due courſe of fallowing, and a little help of dung.

Though you have the marle for the digging within your own ground, and at a little diſtance from your field; the expences thereof is ordinarily eſtimate to fifty ſhillings, or three pound Sterling per acre; and will ſtand more if at a greater diſtance, computing your men and horſes at very eaſy day's wages. And it may be very reaſonably conjectured, that this has been the cauſe, why ſo few marle-pits have been diſcovered or made uſe of in Scotland; the farmers being unwilling to beſtow their time and expences upon it; and moſt of them cannot, be cauſe of their leaſes or tacks, which ſtanding ſo much in the way of all improvement, it is hoped maſters, for their own ſakes, will carefully conſider of it; and think of removing this inconveniency, by granting their tenants longer leaſes.

There is another method to augment your dung, and ſtrengthen your ground by fallowing, which is accounted to be the beſt of all, and may be practiſed with great ſucceſs in ſtrong clays; but is beſt for mixed or varying grounds, as the country people call it: Which take as follows; firſt of all, you are to fallow in the winter, caſting the firſt furrow; the next furrow to be given betwext the bear-ſeed and the oat-ſeed, being dry; at which time your dung to be laid on thinly; the third furrow to be made and finiſhed in the end of May: It muſt be as neatly plowed as a ſeed furrow. On this you are to ſow turnips, which is to be done in rain, or immediately after rain: It is to be thoroughly harrowed, and, if poſſible, made as fine as a lint-ridge; that ſo the black flies, which are apt to deſtroy turnip when it firſt riſes and is tender, may have no ſhelter. If your turnips riſe not thick enough, ſo as to anſwer your intention and purpoſe, you are to ſow them of new, and give it a ſlight harrowing, and roll the ground, which

which will anſwer as well as a ſecond plowing: The firſt ſowing to be in the firſt ten days of June, or rather the end of May; although in England they think the twentieth of June ſoon enough: But we chuſe to ſow them ſooner here on two accounts; firſt, Becauſe of the colder climate; and next, our grounds are not, by far, in ſo good heart and plight as theirs, that in caſe of misfortune, you may have time enough to repair it as aforeſaid. When your turnips are grown to the bigneſs of a large button, they will be fit for hoeing; you are then to enter the field with a hoe ſix inches broad in the mouth; or if you want ſuch gardiners hoes, to uſe ſuch as the country people have for digging of whins. The man who hoes them, puts his foot on the faireſt plant, and hoes up all the reſt round half a foot, and draws a little earth in towards the turnip he hath his foot upon; and ſo continues the work over the whole field, allowing each turnip half a foot: The whole of them then in the field will ſtand at near a foot's diſtance from one another. By this method your field is cleaned of weeds, and the turnips turn big and large; and if your ground has been carefully plowed and prepared, and the firſt hoeing well done, it will not need a ſecond.

The advantages ariſing hence are very apparent; for here is certain good ready food for your ſheep all winter, or for your cattle, which are intended for ſtall feeding, there being no food more proper for fattening them than turnip; which, after they are waſhed, may be cut in two or four, according to their bigneſs; or, if ſmall, they may be thrown in whole before your oxen or cows in the ſtall; which is very much practiſed near London. But obſerve before killing to feed with clean hay and corn, to take the turnip taſte from them; and all the ſhaws muſt be given to the yeld cattle; or if you deſire they ſhould ſerve in place of dung to your fallow ground, they are all to be ſaved and rotted on the earth, and plowed down in the ſpring; after which you may expect a good crop of barley

or bear, to be ſown amongſt the earlieſt of that grain; and you will find it will do more than recompence your labour.

There is another practice of this kind uſed for increaſing your manure, and meliorating your ground, which is in winter. The ground on which you intend to make your fallow for barley, plow it by a cleaving furrow; then after the bear-ſeed is over, ſow in the beginning or latter end of April upon a ſecond furrow, which muſt be gathered, fitches, tears, or gray peaſe; let them grow till they are fully in the bloom; if you have lime in plenty, and want other manure, give it the aſſiſtance of a little lime, to be ſpread as thin out of the cart as poſſible; which has a wonderful effect, where it is aſſiſted either with a little dung or plowed down peaſe: Then this lime is to be laid on juſt before the fourth furrow is to be plowed, which is when the peaſe are rotten. The fourth furrow is neceſſary to be given before winter; not that the ground needs it ſo much for the growing of the grain, as to preſerve it from periſhing with the winter rains, the ground being cloven to the peaſe; which method of plowing is apt to receive damage by the winter rains, the furrows being thrown together, and open in the crown of the ridge: The furrow therefore, after the cleaving down of the peaſe, is to be gathered, and the furrows as well cleaned, and drains made for carrying off the water, as above directed for the wheat. But if you deſign it for bear, the lime may be ſpread at any time after the peaſe are plowed down and expoſed to the winter froſts, rains, and ſnows, the better to waſh it into the ground; but be ſure to water-furrow this ground well, and give the laſt furrow in the drieſt time of March, or beginning of April, and ſow your bear or barley. By this means your ground will be brought to a garden mould, and you may expect a ſuitable return, in gratitude to your good management. It is a common obſer-

vation, that ground can never be too fine, nor too rich for barley, but may be ſo for wheat.

After the barley crop, the farmers in Northumberland and others who have tried that practice in this country ſow oats, of which they have a plentiful crop. No grain whatſoever agrees ſo well with fallowing as oats, or when the ground is ſenſible of fallowing, the effect of which one crop cannot carry off, if it has been in any tolerable heart before: after oats they ſow peaſe, which proſper better after oats, the oats having bound the ground after the fallowing: If your peaſe prove good and ſtrong in the ground, they bring the ground into a fitneſs for bearing of wheat, which will be as good after the peaſe, as if the wheat had been ſown firſt on the fallow, not being apt to lye, or be ſlomy. The advantage of this laſt method of ſowing barley, is, that when your ground lay fallow, you have a crop of turnips, which will prove good and uſeful to you, eſpecially in light grounds; in the other way you can have nothing; and if ſown with peaſe they have time to rot, which they have not if for wheat. *N. B.* If you delay ſowing the wheat till the end of October, the peaſe will be fully rotten.

A little further may be added to the former direction of the ſeed-furrow; which is, That ſome plow only two yokeings, and ſow always the ground when green and freſh, which, as they ſay, keeps it from ſpiring, and preſerves the natural moiſture, which is abſolutely neceſſary for ſummer grain: It is therefore adviſed to try both ways, and chuſe the beſt.

In the counties of Hertfordſhire, and others near London, they make a great improvement by ſowing of buck wheat, to ſerve in place of manure or muck for the ground; which is done as follows; you ſow it after a ſecond furrow in ſpring when you ſow barley, without any mixture of other corns, and lets it grow till middle of ſummer; and when fully grown they plow it down; and this is called a Dung-

ing:

ng: Two buſhels commonly ſows an Engliſh acre; but ur acres will take three; and you buy it at two ſhillings, half a crown per buſhel: You plow it again when you erceive it pretty well waſted, about the end of September, middle of October, and plows it a third time a little af-er, and ſows your wheat, or lets it lye in the ſecond fur-ow all winter for barley or bear next ſpring.

Obſerve in your plowing it down, you make the one fur-ow cover the root and half the ſtalk; the other furrow overs the head, when the plough ſhare does not lay it ight down; ſometimes they mow it, and rack it into the urrow as they plow it; ſometimes they take a crop of it, nd let it come to perfection, and make uſe of the grain or feeding of ſwine; and 'tis admirable for pigeons and owls; In that caſe they preſently threſh it out in the field, nd burn the ſtraw, and ſpread the aſhes along the ground; he ſtraw being very joycy and ſoon conſumes, cannot be ept, and is only fit for dung by burning: When their rounds are thus employed, they beſtow their muck upon heir weaker lands, and there is much more advantage in lowing down the grain than by taking a crop of it.

Since the ſubject of fallowing of grounds is in hands, it s of infinite advantage to bring grounds to right graſs, nd therefore the year before you ſow graſs-ſeeds, fallow he ground and bring it flat, and next ſpring thereafter ſow oats or barley; you will have both a good crop of grain, and, your ground being clean, your ſowing graſs ſeeds will come up very thick, and ſward your ground ſooner after fallow, than any other way you can think of.

ARTI-

ARTICLE XXIII.

A Scheme of Management propoſed for aboliſhing the Diſtinction of Infield *and* Outfield :

In a Letter to the Publiſher.

IN obedience to your deſire, and with a view to promote the progreſs of Improvements, I have ventured to ſend you a few thoughts upon that intereſting ſubject.

It is to be lamented, that the generality of farmers, whether from prejudice to any new plan, or from ignorance, I ſhall not determine, continue (notwithſtanding all the opportunities offered them to learn and practiſe better methods of farming), to jog on in the ſame beaten tracts with their fore-fathers. They perſevere to keep in tillage that part of their farm, which has been ſo for time immemorial, and goes under the denomination of their *Infield.* This is kept under oats and barley, or bear, alternately ; ſeldom under either peaſe or a fallow : It is generally all dunged over once in two or three, never exceeding four years ; and, in conſequence of this management, that part of the farm muſt neceſſarily become very rich ; while the other part, which is commonly the greateſt, namely, the *Outfield*, is wholly neglected ; never receiving any dung or other manure ; but after reſting four, five, or ſix years, it is plowed up, or rather ſcratched with the plough, for two or three years, to make it carry as many miſerable crops of oats ; by which its whole ſtrength being exhauſted, it is left again to reſt.

The method I would recommend for the management of a farm divided in this manner into Outfield and Infield, is this : The whole farm ſhould be divided into twelve parks or diviſions ; and beginning with the Infield, one of theſe diviſions ſhould be fallowed each year, and one crop of barley only taken off it : Along with the barley, graſs-

ſeeds

ſeeds ſhould be ſown, I mean clover and rye-graſs; and ſo on till the whole or greateſt part of the Infield is laid down in graſs. By this management, the farmer's hand is eaſed, ſo that he can turn the whole ſtrength of his farm to the improvement of his Outfield; and fodder is provided for his beaſts, without relying upon the wretched ſupply of ſtraw from his Outfield crops, or the ſtill more wretched paſture obtained from the ley of that Outfield. The produce of his Infield thus laid in graſs will be found equally, if not more, beneficial than when in corn; and his beaſts being well fed, a good ſupply of dung will be obtained for furthering his operations.

In beginning with his Outfield diviſions, he ſhould take a crop of oats for the firſt year, if the ground is worth the ſowing, and fallow the ſecond year; but, if it is not worth the ſowing, the diviſion ſhould be two years in fallow. If there are any ſpooty or boggy places, I would adviſe to drain theſe ſufficiently; and likewiſe to carry off all the ſtones and other trumpery that may be upon it. The firſt plowing for the fallow ſhould be done in the cleaving way, in order to level the ſurface as much as poſſible: The ſecond ſhould be a croſs plowing; after which the ground ſhould be harrowed heartily with large or break harrows as they are called, which are the moſt effectual for that purpoſe; and then plow it up again into ſtreight rigs about ſixteen feet broad. If lime can be had at a moderate diſtance and a reaſonable price, thirty bolls of ſhells, or ſixty of powdered or ſlacked lime, ſhould be provided for each acre, and laid on after the laſt plowing without loſs of time; and a gentle harrowing given to mix it with the ſoil. After this the ground ſhould be dunged, at leaſt to the extent of thirty good cart loads per acre. Before Michaelmas it ſhould be plowed up again, with a narrow gob furrow in the gathering way, in order to lay it as dry as poſſible during the winter.

About

About the end of March it may be ſown with Lincolnſhire barley, of which, if the ſeed is good, three firlots will be ſufficient for an acre. The following year oats, *, the third peaſe, and the fourth year oats or barley, as judgment upon experience ſhall determine to be moſt profitable; and then fallow again. If the ſoil ſhall be judged fit for wheat, I would adviſe to divide the field, and prepare the one half of it for wheat, and the other half for turnips or cabbages, which ever of them the ſoil is beſt adapted for. This part will fall next ſpring to be ſown with oats or barley, as judgment ſhall direct; and graſs-ſeeds ſhould be ſown along with them, as alſo upon the other half which is in wheat.

The firſt year thereafter it will yield a good crop of hay; after which it ſhould be paſtured with cattle or ſheep, or both if convenient, for five years; at the end of which it may be again ſucceſsfully broke up for oats: After the oats a crop of peaſe, then barley, the next oats, and then a fallow again, when it will fall to be managed in the manner before directed.

By this ſcheme of management, the farmer will have five parks or diviſions in oats, one in ſummer fallow, five conſtantly run with cattle, and one in hay; ſo there will be a regular rotation of laying down one park in graſs, and taking up another for oats every year.

The reaſon why I adviſe fallowing twice at firſt, before the

* In the moſt approved modern practice, this courſe, recommended by our correſpondent, is generally exploded, where a due attention is paid to the condition of the ground, and preſerving it in good heart. All the corn crops, viz. wheat, barley, oats, and rye, are eſteemed great impoveriſhers, and never allowed to ſucceed each other, without either a real fallow, or ſome of the enriching crops of peaſe and beans, or beans, turnips, cabbages, potatoes, which are uſually planted in drills, the ground prepared with dung, and the intervals hand-hoed and horſe-hoed, by which the ground receives the full benefit of a ſummer fallow, and the farmer beſides receives the benefit of a crop in place of an unfruitful fallow.

the land is laid down in graſs, will appear obvious to eve-
ry one who underſtands the nature of outfield ground,
namely to deſtroy whins, broom, or other trumpery that
may infeſt the ground, and likeways to reduce the ſoil to
a proper condition for the graſs-ſeeds that are to be ſown
upon it. I hope you will excuſe the lowneſs of the ſtile of
this letter, as I mean to be underſtood by the moſt illite-
rate of my Brother Farmers.

I am, Sir,

Your moſt humble ſervant,

January, 2. 1773. A. T.

ARTICLE XXIV.

Of Farmers planting Trees on their Farms—and of the different ways of applying Lime as a Manure.

In a letter from W. B. in Eaſt-Lothian to the Publiſher.

YOur indulgence in inſerting my laſt letter in your Second Number, and deſiring my further correſpondence, flatters me ſo far as to cauſe me venture to write you a ſecond letter, to be inſerted in your book, if it ſhall be thought to merit it. A deſire to ſerve my Country and my brother farmers is the motive that induced me to trouble you, not any vanity to appear in print, which I am unfit for, any further than to make my meaning underſtood. In your Introduction you have given many ſubſtantial reaſons why landlords ſhould encourage their tenants. Unleſs they receive ſuch encouragement, they will never proceed in their buſineſs with ſpirit. But that is not yet become the general character of our gentlemen, who often, inſtead place of encouraging them, grudge every advantage they obtain; and from a ſpirit of envy or avarice, often diſtreſs their poor tenants, when likely to thrive, with vexatious law ſuits. One ſubject of theſe is cutting trees upon the

the farm: I do not find fault with that, and think no te-
nant ſhould cut a tree which he did not plant. But I
think that landlords ſtand greatly in their own light, tha
do not encourage their tenants to plant trees of every kind
upon their farms. If a tenant has a long leaſe, there is no
kind of improvement he would make ſo much by, both from
the value of the timber, and from the warmth which his
ground would receive from the ſhelter afforded by the
trees. But an invincible obſtacle, I am told, ſtands in the
way for that; for whatever trees are planted by the ten-
ant, they are not his property; they become the property o
the Laird, who will not allow the tenant to cut one o
them, even to repair his roofs or his ploughs, without
ſevere proſecution. This is an evil that ought to be re
medied: If a tenant is diſpoſed to plant trees upon his farm
he ſhould certainly reap ſome profit for his labour and a
tention; and if this were the caſe, there are not wantin
many tenants who would make a figure in this way. A con
dition in the tack might be contrived, empowering the te
nant to plant as much ground of his farm as he pleaſed
with liberty to cut out and thin the trees at equ
diſtances for his own profit, providing he ſhould lea
a certain number at equal diſtances upon every acr
rood, or fall of ground, at the end of the tack
and theſe ſhould be valued and paid for by th
landlord. This would ſpur the tenant to proceed in plan
ing, and it would induce him to take care of, and pr
ſerve the young trees, with as much anxiety as the landlo
himſelf: while, at preſent, the plantations made by th
landlord himſelf are ruined and ſpoilt by the tenants cat
and young beaſts, who is under no obligation or indu
ment to preſerve them, further than from the terror
the law and the fear of a proſecution.

In the belief, however, that there are ſome landlords n
ſo totally blind to their own intereſt, but they will enco
rage their tenants to proceed in planting; and that th

e ſome of my brethren who will embrace that opportuni-
to ſerve themſelves, their landlords, and the Country,
ſhall offer my mite for their behoof.

My former letter gave ſome directions for raiſing hed-
s: Now in forming his incloſures, I would adviſe the
rmer to fence in ſome of the corners to be planted. If
e ground is valuable, it will however amply repay: and
it is of little value, he can ſpare it the better, and the
rner taken off ſhould be the larger: and theſe corners
ould be planted with firs, as being the trees which come
e faſteſt forward, and which he has the greateſt chance
reap advantage from. The ground ſhould be prepared
fallowing and liming; after which two crops of corn
y be taken, which will defray the expences: and the
ound would be thereby rendered ſufficiently looſe and
ll prepared for the tender fibres of the young plants.
ey ſhould be planted out at the diſtance of four feet;
d amongſt them the landlord ſhould plant oaks, aſhes,
ms, beeches, planes, at the diſtance of twelve or four-
n feet for his own advantage, to remain upon the
ound when the firs are cut down. The broader the
ntations, and the thicker the firs are planted, they
ow the taller and freer of knots.

When they are about fourteen or fifteen years old, the
inning may begin, as they will then be fit for many uſes,
d againſt the twentieth year a third of them ſhould be
t out. Fir plantations ſhould be gradually and equally
inned; for when they are allowed to grow up at the
ickneſs in which they were originally planted, though
ey are a very hardy plant, and grow in the coldeſt cli-
ates, yet when the ax is put among them, the air and
nd, to which they were not accuſtomed, being let into
e heart of the plantation, great numbers of them are
und ſoon to decay, faſter than they can be turned to
ofit. In twelve or fifteen years more another third may
cut out. And the remaining third of the bad trees on-

ly ſhould be cut down, and that with caution, leaving the moſt likely ones to ſtand, either for a general ſale near the end of the tack, or for a bargain with the landlord.

In this view, as an acre to be planted with firs, at about four feet diſtance, will require about three thouſand five hundred plants, and allowing the five hundred to decay, there will remain three thouſand trees on the acre. The third part propoſed to be cut out betwixt the fifteenth and twentieth year, may well be reckoned over head worth ſixpence a piece. That amounts to L. 25

The other third propoſed to be cut in the next fifteen years may be eſtimated at a ſhilling each; and they will amount to 50

And the remaining third, which are either to be cut or bargained for at the end of the leaſe, may with great moderation be valued at halt a crown the piece, which comes to 125

So the whole acre of firs will yield L. 200

which I am ſure is moderately computed, and ought to be a great inducement to the tenant to plant: and the landlord likewiſe has a very conſiderable inducement to encourage him to do ſo in this way, as he gets his other trees taken care of all the while, without any expence or deduction for the rent of the ground on which they ſtand.

I ſhall now communicate to my brethren, ſome of my own obſervations on manuring ground, where dung is not to be purchaſed, but where the farmer has acceſs to lime.

Lime may be uſed in various ways; in compound dunghills; liming on the ſward; or liming on the fallow.

Firſt, as to compound dunghills, where rich earth can be had, or the ground of old yards, or of ſtack yards, if it be well fallowed and cleaned, that mixed with a conſiderable quantity of hot lime, and laid up in heaps to ferment, prove, a moſt excellent manure for any land: But I think it is beſt applied upon young graſs immediately after the

the firſt crop of hay is cut. It makes almoſt every ſeed that falls to take root, and thickens the ſward, and makes good and early paſture. Liming on the ſward, where the graſs is rich, and the ſward tender, is an excellent way of uſing lime: But the ground ſhould lye a year or two after laying it on, before plowing up.

Where the ſward is old and courſe, I think it is better to fallow the ground firſt; and when the fallow is a little reduced, and once gathered off the level, then lay on the lime, and harrow it in with a large harrow, in order to incorporate it with the ſoil, as well as to prevent it from falling down to the bottom of the furrow. Let it lye in that ſituation as long as the fallowing will permit: Then gather it up again with a gentle furrow, and keep it as dry through the winter as poſſible; and againſt the ſpring, ſow it on that furrow.

I approve of a good ſubſtantial liming to the extent of eighty or a hundred bolls of ſlacked lime: as it commonly turns out more profitable than a ſlight liming of fifty bolls; for ſo ſmall a quantity has not heat enough to operate a thorough fermentation.

When the farmer has got once through his outfield in this manner, and as I propoſed in my laſt letter, page 85, has got his infield all laid down in graſs, it is eaſy to keep it in good order, by taking only three or four crops, and then fallow it again. If the ground is good, and either dunged or limed on the fallow, he may ſafely ſow wheat, and in the ſpring ſow graſs-ſeeds upon it; they ſhould be harrowed in with a light harrow, and make a roller follow the harrow; this will prove of great advantage to the crop of wheat, being like a hoeing to it; for the harrow looſens and ſtirs the ground about the roots of the young plants, which may have been ſaddened by the winter rains, and thereby they are furniſhed with a greater field of paſture; and if the harrows ſhall pull up any of the plants,

the

the roller plants them again in the looſened earth, which is ready to receive them.

After the wheat, he may expect a very good crop of hay; but I would adviſe to take only one crop, and to paſture the field for four or five years, when he may begin again as above directed.

I earneſtly recommend to my brethren to ſell as little hay as poſſible. The trouble of driving it to market is conſiderable: But where the farmer cannot get dung to buy, it is greatly his intereſt to eat his hay at home: For even ſuppoſing, that he does not make as much profit of his hay by breeding or feeding cattle, or keeping milk cows; yet I compute every ſtone of hay, cut upon the farm, to yield the value of a penny in dung; and each cart-load of dung is well worth half a crown; this, with the trouble and expence of carriage added to the other, will make a very conſiderable odds in the point of profit, by no means to be overlooked, beſides increaſing the ſtock of dung, without which a farmer can propoſe to do but very little.

If you think this letter worthy of a place in your collection, you may uſe what freedom you pleaſe. I wiſh it may be of any ſervice to the world, and reſt,

Eaſt-Lothian, Your's and the Publick's,

Dec. 22. 1772. W. B.

ARTICLE XXV.

Of the Scab in Sheep.

In a Letter to the Publiſher.

WITH great avidity and peculiar pleaſure I read the Firſt Number of the Scots Farmer. I hope, if your plan is well executed, it will promote your own intereſt and the intereſt of your country. An orator of the firſt rank hath ſaid, that Agriculture is Wiſdom's next neighbour; *Agricultura Sapientiæ proxima eſt.* This ſcience has been

been carefully cultivated by every well regulated ſtate, and the politeſt nations in modern and ancient times have made the greateſt progreſs in it. The Chineſe poſſeſſed the uſeful art of printing, and the deviliſh one of making gunpowder, and underſtood the uſe of the mariner's compaſs long before any of theſe inventions were known in Europe. In this moſt populous Empire, Agriculture is of ſuch eſteem, that ſome of the Emperors have not deemed it unworthy of their rank to promote it by teaching it to their ſubjects. The Emperor Ven held the plough himſelf, and his Empreſs aſſiſted in planting mulberry-trees, and kept a houſe for ſilk worms in the palace, in order to ſet a good example before their ſubjects. All the cloaths the Emperor wore were of the Empreſs's own making; and a feaſt was at that time inſtituted, to the honour of Agriculture, which is held annually about the vernal equinox, when the Governors of the provinces aſſemble the peaſants, and walk before them adorned with garlands, and attended with muſic, and all the inſtruments of Agriculture. Happy for this realm, did the Scottiſh Ladies follow the example of this illuſtrious inſtance! Happy for our Swains did our Nobles venerate the plough, and reward the toils of the labourous Huſbandman! Scotia's hills and plains muſt ever mourn, as long as their inhabitants are racked to ſupport cloſe-fiſted avarice and tottering extravagance! I will dop this ſubject; becauſe the generous feel for their native land; the ungenerous will be prevailed upon by no arguments.

Upon Agriculture, Sir, you have many books, from which you may make important extracts; and I make no doubt, that many gentlemen will furniſh you with original obſervations. I am afraid however, that few will write, upon that no leſs material part of your ſubject, the management of the FLEECY CHARGE. It was the conſideration of this that rouſed me, by no means ambitious of appearing in print, but who loves rather to loiter in obſcure repoſe,

repoſe, to deliver to you his ſentiments on a ſubject, which the immortal Maro ſung to Rome in her greateſt glory. No man, that is acquainted with the ſtate of this country, will deny, that the Snowy Flocks, which bleat upon her mountains ſides, contribute moſt of any one article to her riches. Another thing is certain, that few creatures are more delicate, and more ſubject to diſeaſes, than ſheep; but happily the diſtempers to which they are liable are few and ſimple. It is evident, that the more temperate any creature is, the more eaſily is it cured when it falleth into a diſeaſe. Now, if this is true, no creature would admit of a more ſpeedy cure, than this moſt harmleſs and temperate of all animals,

> And yet he never ſupt in ſolemn ſtate,
> Nor undigeſted feaſts did urge his fate;
> Nor day to night luxuriouſly did join;
> Nor ſurfeited on rich Campanian wine.
> Simple his bev'rage, homely was his food,
> The wholeſome herbage, and the running flood:
> No dreadful dreams awak'd him with affright;
> His pains by day, ſecur'd his reſt by night *.

The diſeaſes moſt common among ſheep are, the Scab, the Rot, the Braichan, the Sturdy, and the Sickneſs as it is called, which word plainly ſhows how ignorant the ſhepherds and ſheep farmers are of the nature of this diſeaſe; for the word Sickneſs, with propriety, may be applied to any diſeaſe. Before I take notice of any of theſe diſtempers, it may not be improper to tranſcribe from the celebrated

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*——Atqui non Maſſica Bacchi
Munera, non illis epulae nocuere repoſtae;
Frondibus et victu paſcuntur ſimplicis herbae.
Pocula ſunt fontes liquidi, atque exercita curſu
Flumina; nec ſomnos abrumpit cura ſalubres.

VIRG. Georg. Lib. III. l. 525.

rated poet already mentioned, the infallible ſymptoms of pproaching Sickneſs: "Whatever ſheep (ſays he) * thou ſeeſt either ſteal away at a diſtance from the flock under the gentle ſhade, or liſtleſly crop the tops of the graſs, and drop behind the reſt, or lie down while feeding in the middle of the plain, and return alone in the late even- ing; immediately ſeparate the ſickly animal from the reſt, before the dire infection ſpreads among the unwary Flock." Now, though the Scab and ſeveral other diſ- aſes which infeſt the fields be infectious, yet ſuch is the want of knowledge among t ſhepherds, and ſuch the inat- ention of ſtore-maſters, that they never ſeparate the heal- hy from the ſick; although it is become a proverb, That ne ſcabbed ſheep infects the whole flock. This proverb olds with reſpect to ſeveral other diſeaſes; and therefore cannot help obſerving in paſſing, that every conſiderable tore-maſter ought to have an incloſure of a few acres, more or leſs according to the number of his flocks, in which nfirmary he ought to ſhut up the diſeaſed. It is needleſs ere to point out what other advantages would accrue rom ſuch an incloſure. The Scab, it would appear, was he moſt fatal diſeaſe among the Sheep in Italy when the reat Virgil wrote; for, unfortunately for us, of it he nly treats. The cauſes and the cures of this diſtemper re ſo clearly pointed out by him, that I cannot reſtrain myſelf from quoting his authority again: "The filthy Scab (ſaith he) † infects the ſheep, when the cold rain, and

* Quam procul aut molli ſuccedere ſaepius umbrae
Videris, aut ſummas carpentem ignavius herbas,
Extremamque ſequi, aut medio procumbere campo
Paſcentem, et ſerae ſolam decedere nocti;
Continuo culpam ferro compeſce, priuſquam
Dira per incautum ſerpant contagia volgus. Lib. III. l. 464.

† Turpis ovis tentat ſcabies, ubi frigidus imber
Altius ad vivum perſedit, et horrida cano
Bruma gelu: vel cum tonſis inlotus adhaeſit

Sudor,

" and winter's hoary froſt have penetrated into the quick:
" or when, after ſhearing, the ſweat is allowed to remain
" unwaſhed upon their bodies; or when prickly briars have
" torn their tender ſkins: To prevent this evil, the careful
" ſhepherds, after ſhearing, plunge their whole flock in
" running ſtreams, and compell them with well drenched
" fleeces to ſwim along the deep; or beſmear their bodies
" with lees of oil, mixed up with ſquills, hellebore, ſulphur,
" pitch, and unctuous wax. But there is no remedy ſo
" effectual for their diſtreſs, as to lance the head of the
" ſore or ulcer with a ſharp knife; for the diſeaſe is nou-
" riſhed, and gathers ground by being covered, while the
" ſhepherd abſtains to apply his healing hand to the ſore,
" and ſits ſtill imploring heaven with idle prayers for aid."
The reader will eaſily diſcern, that one of theſe cures is preſcribed for the ſummer, the other for all the ſeaſons. As my letter is grown to an enormous length, I muſt conclude at preſent: In my next I ſhall treat, in as few and perſpicuous words as poſſible, of the other diſeaſes,

I am, Sir, with reſpect,

Edinburgh, Dec. 28th 1772. your moſt humble ſervant,

P. P.

Sodor, et hirſuti ſecuerunt corpora vepres.
Dulcibus idcirco fluviis pecus omne magiſtri
Perfundant, udiſque aries in gurgite villis
Merſatur, miſſuſque ſecundo defluit amni:
Aut tonſum triſti contingunt corpus amurca,
Et ſpumas miſcent argenti, vivaque ſulfura,
Idaeaſque pices, et pinguis unguine ceras,
Scillamque elleboroſque gravis, nigrumque bitumen.
Non tamen ulla magis praeſens fortuna laborum eſt,
Quam ſi quis ferto potuit reſcindere ſummum
Ulceris os, alitur vitium vivitque tegendo:
Dum medicas adhibere manus ad vulnera paſtor
Abnegat, aut meliora deos ſedet omina poſcens.

VIRG. Georg. lib. III. l. 441.

*** The foregoing letter cannot fail to give peculiar ſatisfaction to ſuch of our readers as are patrons of Agriculture, and acquainted with the reading of the Claſſicks; as it ſets Virgil in a conſpicuous point of view, as an author that may be very uſeful to farmers, not only with reſpect to the labouring the ground, but in other matters reſpecting the farmer.

His Georgics are allowed to be the moſt compleat and finiſhed piece of Latin poetry; but they are ſeldom conſidered as a book of farming, containing juſt and uſeful inſtructions to the Huſbandman; of which the preſent ſubject is a very ſtriking inſtance. The diſeaſe here treated of, is to this day aſcribed to the ſame cauſes, and the ſame remedies are preſcribed for it.

Gervaiſe Markham ſays, That the general ſcab or itch in ſheep is of all diſeaſes the moſt common among them, proceeding from rainy wet weather, which falling upon their ſkins, if they happen to be chafed or heated afterwards, they preſently break forth into ſcabs, which you ſhall know by a white filthy ſcurf ſticking upon their ſkins: and the moſt uſual medicine for the ſame, which all ſhepherds uſe, is to anoint the place with tar and greaſe mixed together.

Mr Ellis gives this account of it. Firſt, he ſays, ſheep are more ſubject to breed the ſcab in the ſpring and ſummer ſeaſons, than at any other time of the year; becauſe then they are moſt thriving, the weather hotteſt, and the blood apt to be in the hotteſt ferment. Secondly, this malady is oftentimes occaſioned by a flock of ſheep being drove by a heedleſs ignorant boy or man; for it has been too often experienced, that flocks of ſheep have ſuffered much from their ill conduct, particularly by the ſcab; which at the firſt proceeds from exceſſive heat of blood and ſurfeiting, by either hard driving them, or hurrying them out of their natural walk: Thirdly, by their being drove through narrow lanes, that confines them in too cloſe company; or by penning them too cloſe: Or fourthly, by contagion, according to the old proverb, One ſcab-

ed ſheep ſpoils a whole flock: for one of theſe may cauſe the death of a hundred, as the ſcab is of ſo catching a nature, that if the cure is neglected it will infect the reſt of the flock, and although this grievous malady may be eaſily cured at firſt, yet I have known ſome let it run, till many other ſheep have been damaged and killed by it.

The poet adviſes, when, from the ſymptoms he deſcribes, it is certain that a ſheep is deeply infected, to kill him directly, *Continuo culpam ferro compeſce:* Our correſpondent's propoſal of a ſeparate incloſure or infirmary, wherein to put the infected ſheep, may ſave to the ſheep farmer many of his flock; and there he can at leiſure apply the remedies. Ellis gives ſeveral receipts. One is a compoſition of tar, greaſe and juice of rue, made into an ointment over a gentle fire, in order to rub the place affected. As alſo ſoot, tobacco ſtalks, and flower of brimeſtone, boiled up with chamber lee. Another is, of tobacco-water: a quart or Scots chopin, two ounces brimeſtone, a quart of urine, and two handfuls of ſalt, boiled together for waſhing the part aggrieved, giving them ſalt and water at the ſame time to drink; and by adding ſix ounces of tar, it cures the itch, and kills maggots, lice, and ticks. He likewiſe gives a receipt for a compoſition with ſublimate or white mercury; and Mr Liſle gives the following, An ounce of white mercury, and two ounces of ſtone vitriol, diſſolved in three quarts or Scots chopins of water in a glazed earthern pot, to waſh the part affected; but that is too dangerous a medicine to be truſted in the hands of common ſhepherds. The moſt common and general cure is, a compoſition of tar and greaſe; and if a little ſulphur is added, it will be the more efficacious.

Of a Machine for lifting great Stones upon a Carriage: In a Letter to the Publiſhers.

BEING informed of your propoſal of publiſhing a monthly book for promoting the knowledge of Agriculture,

ture, I heartily wiſh you ſucceſs and encouragement in ur undertaking, ſo well calculated for the good of the untry; and I hope every perſon will contribute what s in their power for that end.

Knowing the great difficulty that farmers are often put in getting large weighty ſtones removed from their lds, which often cannot be got done but by blowing em in pieces with gunpowder, which is always attended th danger and expence; I have been induced to ſend u a rough ſketch of an inſtrument for lifting great nes upon a cart or carriage, which every farmer may ve by him at a ſmall expence, and it can be wrought with le trouble. [See Plate I. Fig. 2.] If the ropes or chains be got put under the ſtones, by lengthening the handle, e man may raiſe a ſtone of greater weight, than ſix men l do with their hands, pinches or handſpakes. For it well known to mechanics, in working with the Lever, ich is the name of this inſtrument, the power requiſite raiſe the weight is in a reciprocal proportion of the diſ- ces of the weight and the power from the centre; as ppoſe, the weight to be raiſed is a ton weight, and the ok on which it is hung is a foot diſtance from the cen- ; and the handle is four foot diſtance, then a power ich ſhall be equal to a fourth part of a ton will coun- poiſe it, and a perfect trifle more added to it will over- me or raiſe the weight off the ground. If the handle is ht foot long, a power equal to an eighth part of a ton, d a trifle more will raiſe it: And as the Lever will turn ittle about on the hook on which it is hung, the ſtone be laid gently on the cart or carrriage, without danger trouble.

The ſupporters may likewiſe be applied to hang a bal- ce or ſteel-yard, for weighing hay, or other goods.

If you think the publiſhing this, and giving the farmers raught of it, can be of any ſervice, you are very wel- ne to it, and I ſhall be happy, in ſo far as I can ſerve my ntry and you.

rief, Dec. 7th 1772. I. H.

The prices of GRAIN at HADDINGTON, for the Months of November and December 1772, with their AVERAGE.

	Wheat.			Barley.			Oats.			Pease.		
	1.	2.	3.	1.	2.	3.	1.	2.	3.	1.	2.	3.
Novem. 6.	21 0	20 0	18 6	16 0	15 0	14 6	14 0	13 0	12 6	13 6	12 6	12 0
13.	21 0	20 0	19 6	16 0	15 0	14 6	14 6	14 0	12 6	14 0	13 0	12 0
20.	20 6	19 6	18 0	17 0	16 6	14 8	14 6	14 0	12 8	15 0	14 6	13 4
27.	20 9	19 6	18 2	17 0	16 4	14 6	14 7	14 2	12 6	15 0	14 4	12 8
Decem. 4.	22 0	21 0	19 6	17 6	16 8	16 0	14 6	14 0	13 6	14 8	14 0	13 8
11.	22 6	21 0	20 0	18 0	17 0	16 4	15 0	14 0	13 8	15 0	14 0	12 6
18.	22 6	21 0	20 0	18 0	17 6	16 8	15 0	14 6	13 4	15 6	14 0	12 6
25.	23 0	22 0	20 6	19 0	18 0	16 8	15 0	14 6	12 9	15 6	14 0	12 6
Average	21 8	20 6	19 3½	17 3½	16 6	15 5½	14 7½	14 0½	12 11	14 7½	13 9½	12 7½

THE SCOTS FARMER,

FEBRUARY 1773.

ARTICLE XXVII.

improving Grounds by claying and marling—Turnips wing—Fattening of Cattle—and ſowing Clover and Rye-raſs ſeeds *.

Turn to the arts, the uſeful pleaſing arts
Of Cultivation; and thoſe fields improve
Your erring Fathers left too long deſpis'd.
Leave not to ignorance and low-bred hinds,
That nobleſt ſcience, which in ancient time
The minds of Sages and of Kings employed,
Sollicitous to learn the ways of God,
And read his works in Agriculture's School.

PUBLIC VIRTUE, A Poem: By Mr DODSLEY

THAT the wealth of every nation is proportionable to the number and induſtry of its inhabitants, is a truth at will admit of no diſpute. Whatever therefore contri-tes towards increaſing the number of individuals in any country,

* This eſſay was firſt publiſhed in 1755, under the title of "Propo-ſals for enriching the Principality of Wales," and was republiſhed 1762. It has been earneſtly recommended by one of our correſpon-ents; who very properly obſerves, that the ſituation, condition, and rcumſtances, of Scotland are ſo ſimilar to that of Wales, and the in-ructions there given ſo much adapted to our climate, neceſſities and ants, that, unleſs where any thing is mentioned peculiar to that prin-ipality, Scotland may, in the reading, be very well ſubſtituted in place f Wales: And flatters himſelf it may be of ſervice to that uſeful claſs f men, for whoſe benefit our publication is principally intended.

country, and has a tendency to quicken their induſtry, muſt add to the wealth and power of that country.

The following ſcheme is calculated to promote theſe ends. If the natives of that country will diveſt themſelves of prejudice, and conſider it with attention; it is hoped the reaſonableneſs and propriety of theſe propoſals will appear, and ſufficiently recommend them to their approbation. To ſee a better plan would be the greateſt ſatisfaction to me: but to ſee even this adopted and happily executed would give me uncommon pleaſure.

That the Principality of Wales can juſtly boaſt of many of thoſe advantages, which are thought to contribute towards rendering the people of any country numerous, no one will doubt, who conſiders, that our liberties and properties are ſecured; that all ſects and parties are tolerated in the free exerciſe of religion, according to their reſpective opinions and manner of worſhip; that our ſituation is preferable to that of moſt, if not all, other countries; that we have a great number of very convenient ports; and that we abound in thoſe native productions, which are juſtly reckoned the ſtaple commodities of ſeveral countries in which trade and commerce flouriſh.

If we were nicely to enquire, why the natives withdraw themſelves from a country that can boaſt of theſe advantages, and why this country is ſo thinly inhabited, ſome of the chief reaſons would appear to be, *a ſcarcity of moſt of the neceſſaries of life, and the want of domeſtic induſtry.*

Now whatever country abounds in the neceſſaries of life, muſt alſo abound in the lower claſs of people. For where-ever the neceſſaries of life are cheapeſt, thither all ſorts of people, but more particularly the induſtrious, will reſort. But the neceſſaries of life, if the directions laid down in theſe papers are followed, will be cheaper in Wales than in any other part of his Majeſty's dominions. An inducement this, not only to keep our countrymen at home, but likewiſe to invite and bring over others to ſettle

amongſt

amongſt us. The numbers, who annually withdraw themſelves from us, and ſpend the remainder of their days in London, Briſtol, Liverpool, Cheſter, and other parts of England, are increadibly great, and the annual loſs of their labour amounts, upon a moderate calculation, to 24,750 *l.* * But theſe natives, if they could advantageouſly, would gladly be employed in their own country. In this caſe they would marry, encreaſe and multiply; and the coming over of Engliſh, Iriſh, &c. would make, probably, no inconſiderable addition to the number of our inhabitants. Our improvements would then become the ſubject of admiration; would raiſe the world into a fit of wonder; and what was once ſaid, upon a different occaſion, might with ſtrict propriety be applied to us—*See how the Britons flouriſh!*

The principal means, recommended in theſe ſheets, for improving eſtates in Wales, and enriching the inhabitants, are the following—*Claying and marling—Turnip ſowing—fattening of cattle,—and the ſowing of clover and rye graſs ſeeds.*

Where the lands are too light or ſandy to produce good crops, it will be proper to give them a coat of clay of the yellow or blue kind, which is the beſt, though the brown or dark ſort will do. On the other hand, where they are too heavy, cold, or moiſt, they may be covered with a brown or white marle. Forty or fifty loads an acre are ſufficient for ſome ſorts of lands: for others, ſixty or ſeventy will be found neceſſary; but upon a medium, the quantity will be laid at ſixty cart loads an acre.

Great are the improvements to be made in all ſorts of lands, by this ſingle article of claying and marling.

There

* This obſervation applies to every part of Scotland, but with peculiar force to the North and Weſt Highlands: the late emigrations from theſe quarters, which can ill ſpare inhabitants, call aloud for a remedy; and none bids fairer than the improving uncultivated waſtes, which will provide labour and proviſions for uſeful hands. [See No I. page 18.]

There are, however, three ſorts of lands where theſe methods will be found uncommonly ſucceſsful; viz. Old heath ground—lands that have been impoveriſhed, and quite worn out with continual plowing, producing more weeds than corn,—and old paſture-ground, whoſe ſurface is rendered uneven by ant-hills, or is covered over with beggarly moſs.

But the advantages ariſing from this method are moſt remarkable in old heath ground, or that which has lain waſte for a great number of years, and perhaps has never been plowed at all, nor of any other uſe but as ſheep walk or warren. This kind of ground in general, of all others, will produce the greateſt crops, and anſwer the charge of claying and marling beſt.

The method to be taken with this ſort of ground is, to plow it up in winter, by reaſon of the moiſture in that ſeaſon, and that the flag or ſurface may have time to rot during the time of claying or marling, before it be ſown either with turnips at Midſummer, or with wheat or rye at Michaelmas. It ſhould be plowed and well harrowed four times before it is ſown with turnips, and clayed or marled after the firſt or third plowing, or before it is plowed at all, juſt as it ſhall be moſt convenient for the farmer. Either method may be choſen. But if the land be clayed after the firſt plowing, the clay and mould will incorporate the better, by means of the frequent plowings that are to ſucceed, and be more likely to produce a good crop.

If turnips ſhould be ſown about * Midſummer upon land thus managed, they may generally without † tath or dung: but if wheat or rye about Michaelmas, then it will be proper either to fold ſheep one night on every part of the

* The propereſt times for ſowing all ſorts of grain are as follows; rye in September; wheat in October; oats and peaſe in March; and barley in the beginning of April.

† Tath is the dung and urine of ſheep, &c.

the ground, or to carry on ten, twelve, or fifteen cart loads of dung on every acre; this with about ſixty loads of clay or marle, drawn by four or five able horſes, will ſeldom or never fail to produce extraordinary crops; and the land, which before, perhaps, has not been worth ſix-pence an acre, by this method, will be made worth ten or twelve ſhillings.

When turnips are the firſt crop of this new-made land, they are to be fed off by ſheep, or cows and oxen, or by both kinds of ſtock, whoſe treading more intimately mixes the clay with the natural ſoil, and ſeparates its particles in ſuch a manner, as to give a more eaſy entrance for the tender fibres of the corn to extract its virtue. Beſides this, and which is of great conſequence, the tath or dung and urine of bullocks, but eſpecially of ſheep, abounds with a ſaline and ſaponaceous quality of experienced ſervice, and well known to contribute much towards vegetation: ſo that the barley crop, which ſhould always ſucceed the turnips upon land thus ordered, may be ſown with the greateſt aſſurance of ſucceſs. Forty or eight and forty buſhels an acre have been produced by this manner of improving land, of no more value, in an unimproved ſtate, than what was mentioned above.—An increaſe highly ſufficient to anſwer the owner's or the farmer's charge; an increaſe that redounds to the reputation, as well as profit, of all the huſbandmen who practiſe this method; and which cannot but afford great encouragement to others to try the ſame.

The ground ſhould be plowed three times for barley after turnips, i. e. twice plowed and harrowed to make it clean and light; and then the barley ſown and turned in with the plough. Three or four days afterwards the ſame ground ſhould be ſown with clover, about ten pounds an acre, and harrowed once over with light harrows, or which beſt ſuits this ſort of land of which I am ſpeaking, being for the moſt part of a light nature, about ſeven * or eight pounds

* Some judicious farmers ſow ten or twelve pounds.

pounds of clover ſeed with a peck * of black and white nonſuch, or what is commonly called rye-graſs. Either of theſe helps to thicken the ſet, makes the clover, which alone is not ſo † ſafe, a rich and more wholeſome paſture for cattle, and comes on ſomewhat earlier in the ſpring than clover alone. If the ground be of a ſtiff and deep ſoil, clover alone is ſufficient, becauſe the roots ſtrike deep and delight in a ſoil of that ſort. Two good crops of clover may be had in one ſeaſon; or if it ſhould be fed, it affords great plenty of graſs, far exceeding the beſt old paſture-land. Wheat ſhould generally be ſown after clover, and it will commonly produce crops of equal goodneſs to thoſe upon ground thoroughly ſummer-tilled. The clover-land ſhould be covered with dung; and that turned in with the plough; the wheat ſown above; and harrowed twice over. If rye graſs be mixed with the clover, the land ſhould be plowed twice before the wheat is ſown, in order to kill the rye graſs roots, otherways they are apt to grow up with the wheat, and injure the crop. After wheat, turnips ſhould ſucceed again, and ſo on in a continual round.

This is the beſt and moſt approved method of farming — a method which ſeldom fails of producing good crops and never baulks the expectation of the farmer. There are indeed, other methods in practice, ſuch as taking a crop of peaſe or oats after barley: But the laſt cannot be done without impoveriſhing the land, and giving an opportunity for many weeds to ſpring up, and making it very foul.

I have been ſpeaking of the advantages of claying or marling old heath ground, ſuch as has been almoſt uſeleſs and has never, or however not for a long time, been plowed. Inſtead of breaks, furz, or ling, you may have the firſt year a crop of turnips worth thirty or forty ſhillings an acre; the next barley worth fifty ſhillings or three pounds

* The Engliſh peck is the fourth part of their buſhel.

† Becauſe cows, oxen, &c, when firſt put to clover in the ſpring, are ſubject to burſt.

pounds; then clover, or clover and rye graſs worth two guineas an acre; and a crop of wheat worth four or five pounds. Very great advantages indeed! and although claying or marling be a conſiderable expence, amounting to twenty-five or thirty ſhillings an acre, yet the charge is anſwered and repaid, even in the firſt crop; but more abundantly afterwards, ſuch ground producing good crops for twenty years ſucceſſively, the virtue of clay being known to laſt ſo long. Such are the benefits of claying old heath ground, which has not, for time immemorial, been plowed.

Very ſimilar, though not quite equal, are the advantages of claying lands which have been impoveriſhed, and quite worn out with continual plowing, producing more weeds than corn.

Its effects are very conſpicuous the firſt year. The crop is incredibly better; and the growth of weeds, ſo common and detrimental to poor land, is checked. This ſort of land will be beſt clayed immediately after harveſt, that the clay may be expoſed to the winter's froſt, which will make it ſufficiently tender and mellow, and diſpoſe it to mix better with the natural ſoil; or it may be clayed as early in the ſpring or ſummer, as the farmer's convenience will admit, with this caution only, that it be done early enough for plowing the land three or four times before the turnips are ſown. If theſe turnips are houghed once or twice over, the weeds are ſo checked as never to appear in like manner after. So that ſowing turnips for the firſt crop after claying is certainly the moſt prudent method: For then the barley that follows will be clean, and the land in right order to receive clover and rye graſs ſeeds, with which it ſhould be laid down for a year or two, and then it will riſe fit for wheat; for it is an indiſputable maxim, that if lands be laid down foul, it will be found ſo, when it comes again to be plowed.

To plow up old paſture ground, when its ſurface is rendered uneven by ant hills, or is covered with a beggarly moſs,

moſs, is a moſt excellent method. It ſhould be ſown with peaſe or oats the latter end of February, or the beginning of March, or about Lady-day, if it be a cold or wet ſoil. If theſe take, and prove a good crop, a ſtop is thereby put to the growth of all pernicious weeds, the land is mellowed, and becomes fit for wheat the Michaelmas following. As ſoon as the crop is off, whether peaſe or oats, the land ſhould be plowed, that the grain which is ſcattered in the time of harveſt may have time to ſpring before the wheat is ſown, elſe they grow together, and are injurious to each other.

After wheat turnips, then barley, and if the ground be deſigned for paſture continually afterwards, hay or natural graſs ſeeds are proper to be ſown in a larger proportion than was mentioned above; two buſhels an acre at leaſt; but becauſe theſe are often mixed with ſeeds of a different kind neither good in their nature, nor eaſily diſtinguiſhed, it may be as well to ſow clover ſeed together with black and white nonſuch and white ſuckling, which make a moſt delicious ſeed, and ever remain better than what the old land produced before.

And here I would recommend the roller, as a very uſeful implement in breaking the clods of ſtiff and heavy land when firſt plowed after a crop of turnips; it is frequently uſed upon wheat in the ſpring, and always upon lands laid down with graſs ſeeds.

Theſe four crops of peaſe or oats, wheat, turnips, and barley, are all produced without fath or dung, the ground greatly improved, the ſurface of it made level and beautiful, and the ſucceeding paſture more in quantity, and better in quality. This method conſequently recommends itſelf to the inhabitants of that principality for whoſe ſake theſe obſervations were made. The leaſes, indeed, even in counties where farming is well underſtood, generally prohibit the breaking up of this ſort of ground, under the penalty of five pounds an acre: but I think without re-

; for there are many thouſands of acres capable of rovement by this method, of being rendered more utiful to the eye, and much more beneficial both to landlords and the tenants.

The land by this means would let for more: and it ld be a more equal way of managing it; becauſe it ld give other parts of the ground, which have been inually under the plough, time to reſt and recover their gth and generative quality.

muſt, however, be remarked in relation to old paſture-, that if it be not ſufficiently dry, it will never quit the to break it up. There are large parcels of this ſort oſt counties, where clay or brick-earth lies ſo exceed- near the ſurface, that there is ſcarce mould enough raiſed for the nouriſhment of corn; beſides its roots ſo ſocked in wet, becauſe the water cannot ſink thro', that it, in a great meaſure, periſhes. This ſort of und, for theſe reaſons, produces the leaſt graſs, and is lateſt of any in the ſpring, before it is fit for ſeed. It ld be a good method, in this caſe, to keep the ditches ficiently deep, provided there be a fall for the water.

efore I proceed to the other particulars, it may not be roper to obſerve, that to mow with the ſcythe all ſorts grain (wheat excepted) is by far the moſt expeditious, conſequently the leaſt expenſive method; barley or ſhould be in ſwathes four or five days, and then be ga- ed with forks and carried, and the ſcattered remains ed up with a drag-rake; of which, and the method of g it, take the following deſcription: The head is about n feet long, the teeth five inches, and two inches and a aſunder; it is drawn by a man with a leathern ſtrap r his ſhoulders, who begins at one corner of the field gging acroſs till the teeth are full, and then diſengages rake, and ſo continues till he has croſſed the field; then rns in the ſame manner, always leaving the corn in a , that it may be more eaſily gathered and carried away.

It will be alſo proper to take notice of the wheel plough, which, according to the opinion of many very good judges, is greatly preferable to all other ſorts: but, if I am not miſtaken, the foot plough is equally ſerviceable with regard to expedition and a neat manner. Each of them, however, is drawn by two horſes a-breaſt, which is, by experience that ſafeſt guide, found, in many counties, to be a power ſufficient to break up the heavieſt land; which may ſerve to ſhew the inexpediency of teams of oxen; and the neceſſity of laying that abſurd method aſide. One man, with two horſes, can plow twice the ground, in the ſame ſpace of time that a man, who muſt have a boy to drive the oxen, can with a horſe and two yokes of oxen. The expence of keeping two horſes is conſiderably leſs than that of keeping four oxen and a horſe; and the horſe ſubſtituted in the room of the oxen may be ſerviceable upon a variety of other occaſions. To theſe advantages may be added that of ſaving a boy's wages and his board.

In breaking up the ground the firſt time after it has been clayed or marled, too great a depth ſhould carefully be avoided: between four and ſix inches is a ſufficient depth, but a greater than ſix ſhould never be taken.

Let us now conſider the culture of ground for turnips. A looſe, ſandy ſoil is the propereſt for them *; but when it happens to be a denſe, heavy one, the parts may be ſeparated, and the ſoil rendered lighter, by the laying on of ſand, according to the practice of many farmers, who ſitua-

* Solum utre et ſolutum res utraque (ſpeaking of rapes and turnips) deſiderat, hec denſa naſcitur humo. Colum. l. 11. c. 10.

It is a certain and juſt obſervation, that turnips thrive beſt in looſe and light ſoil; for which reaſon, when ſtiff lands, ſoon after the appearance of the turnips, have received heavy rains, and are, as it were, baked by the heat of the ſun, it is highly proper to draw a light harrow over them to looſen the earth; but this ſhould never be done when they are larger than walnutes. Thoſe who never ſaw this practice, may imagine that it muſt injure or eradicate the greateſt part of them; but not one in 500 is hurt by it.

ituated on the ſea-ſhore. If the land is light, it muſt have hree earths; but if heavy, four. The firſt earth, in geeral, ſhould be given in March, though ſome plow it beore Chriſtmas; the ſecond after barley-ſowing is over; he third a fortnight after, and the fourth a fortnight fter that. Turnip-ſeed, in ground that is remarkably ry, may be ſown in the middle of May, O. S. the turnips are intended to be eaten about Mihaelmas: otherwiſe they will not ſtand the winter, eſpeially if it be ſevere; though in ſome places it is the genel rule to ſow them from the 4th of June to the 27th, and ven to the firſt or ſecond week in July O. S. but thoſe own from the 14th to the 25th are thought to do the beſt. It requires a good deal of practice to ſow * turnip ſeed ell. A ſkillful and experienced perſon will ſow a whole cre with an Engliſh pint; a pint and a half of new, and a uart or three pints of old ſeed, are the proper quantities; hereas a perſon not uſed to this buſineſs will hardly make quart or three pints do.

The hoeing of turnips requires a particular conſideration. t is a rule in all parts where the method here recommendd prevails, to have a hoe, whoſe helve, handle, or ſhaft is hree feet and a half, or four feet long, and whoſe head is rom nine to eleven inches broad, and four, or not more han four inches and a half deep; and the diſtance of the urnips left for a crop, one from another every way, ſhould e fourteen or fifteen inches. Turnips ſhould be hoed wice; the firſt time a month or five weeks after they are own; and the ſecond time about a fortnight afterwards.

But

* As farmers ſervants and day-labourers have not been uſed to ſow and hoe turnips, it will be proper for three or four gentlemen, for the benefit of their tenants, to hire a journeyman gardener for nine or ten weeks; and if he makes it his buſineſs to direct one farmer for one half day, and another for another, the myſtery will be revealed to half a county, by the means of one man, in one ſeaſon. Though I cannot help thinking but I have been ſufficiently clear and explicit upon this, as well as every other particular, to ſupercede the neceſſity of any ſuch aſſiſtance.

But there can be no exact limitation of lime, ſeaſons being ſo various: this, therefore, muſt be left to the prudent farmer's diſcretion, who will neither begin to hoe while the plants are too ſmall and tender, nor delay it till they are become too large, and have begun to injure one another. Though the expence of thus hoeing them twice is not leſs in ſome places than five, ſix, or ſeven ſhillings an acre; yet the inconſiderable prime coſt of the ſeed, and the goodneſs and great value of the crops make very ample amends for this great expence. People who have attempted in ſeveral parts of this kingdom the propagation of turnips, have deſpiſed the directions given them about hoeing, probably on account of the great expence of it; and their endeavours, conſequently, have never been attended with ſucceſs. But if turnips are ſuffered to grow up without hoeing, they are perfectly choaked by weeds; are, generally ſown ſo thick that they hinder each other's growth, and can never be of any ſize: whereas if they are hoed in the manner here directed, the following conſequences muſt flow from it: The ground will be cleared of weeds, rendered more looſe and open, will be greatly enriched and meliorated; and the apple of one turnip will be larger, more juicy, and in every reſpect preferable to the apples of twenty turnips that are never hoed. If therefore any of the perſons, for whoſe ſervice theſe papers are drawn up, ſhould encourage the growth of turnips, let them carefully obſerve the directions here given about hoeing, otherwiſe their expectations, how ſanguine ſoever, will infallibly be diſappointed; but if they follow this advice, the ground will be like a well-cultivated garden with regard to freedom from weeds and richneſs of ſoil; they will have fine ſeed in the depth of winter when there is no graſs, and when hay is frequently very ſcarce: and the food, I mean turnips, is preferable to both; for it keeps the bodies of beaſts cool, and fattens them incredibly, much faſter than the fineſt hay: it will, however, be very pro-

per to give them a little hay every night and morning, when the weather is very inclement and ſevere; but, in general, turnips and ſtraw are ſufficient. If the crops of turnips are in low, moiſt ground, it will be the beſt way to pull them up, and feed the bullocks with them in ſome dry cloſe that is contiguous; but when they are in hilly, dry, light grounds, the beſt way will be to detach and fence a part of the incloſure with hurdles, and to turn the ſtock that is making up for market into that ſeparated part; and when they have fed upon the turnips in this ſpot a ſufficient time, the ſame method muſt be continued 'till the whole cloſe is fed off. If this direction is not obſerved, a ſmall quantity of ſtock will tread and deſtroy a large tract of turnips in a day or two, and will be perfectly cloyed with them; whereas if they are permitted to eat off but a ſmall portion at a time, every ſpot even of the ſame field becomes a freſh courſe, and will be a ſort of whet to them. The reaſon why turnips are to be pulled up in a ſtiff, heavy ſoil, and fed in ſome ground adjoining, is, becauſe low, moiſt ground ſhould be trampled as little as poſſible, to prevent too great a coheſion of the parts; beſides the turnips would be more than half ſpoiled with dirt; but when the ſoil is looſe and ſandy it can not be trod too much; for the more it is hardened and cemented the better, the more excellent the compoſt; and where the ſoil is light, the feeding the turnips off will greatly enrich it.

Bullocks which are fed in a houſe will be fat much ſooner than thoſe that are fed abroad. Twenty acres will fatten a ſcore in a houſe; and the offal will be ſufficient for a ſcore ſheep and as many ſteers; but leſs than thirty acres will not fatten the ſame number in the open field: nay ſome bullocks will require thirty-five or forty acres; but then it will take up two men's time, and a horſe to tend thoſe in the houſe; and the original expence of a bullock houſe, the conſtant one of keeping it in repair, and the carrying out the dung, are very conſiderable: ſo that I am

enclined

enclined to determine in favour of feeding in the open air. But take which you will, the grain, upon a medium, will be five pounds a bullock.

As ſending oxen away lean is a great loſs to the inhabitants of any country, I muſt beg leave to dwell a little longer upon this particular, which, when we ſhall have taken a view of the many and great advantages ariſing from fattening them before they are ſent away, will appear to deſerve our conſideration more than may at firſt be imagined. Oxen which are bought in lean in the month of September or October, and fed upon turnips till the beginning of April, and then upon clover and rye graſs till the latter end of May or the middle of June, will pay to a careful and judicious perſon from four to ſeven pounds a head for keeping, attendance, and intereſt of money; the land which has been impoveriſhed by a wrong management and want of manure, will by this means be greatly improved, and of courſe yield much better crops; and indeed it is clear, beyond all diſpute, that farming, without the aſſiſtance of graſing or a dairy, cannot be a very advantageous buſineſs; but yet the generality of farmers, who proceed in the manner here directed, prompted to it by cuſtom and example, without conſidering cauſes and effects, aſcribe their great ſucceſs to the growing of corn alone; without tracing, though the more remote and leſs apparent, yet the greateſt, not to ſay the only cauſe of it.

There is but one objection againſt purſuing this method of fattening oxen in Wales, viz. The great diſtance from the metropolis. The driving fat oxen ſuch a number of miles would, it is apprehended, reduce them ſo much as to render them unſaleable. This inconveniency might be * removed in the following manner: when the drove

* And if there was a conſtant ſupply of fat oxen, markets would be created in Wales, as they have been in other parts of the kingdom, where people, even thoſe of large ſubſtance, lived the greateſt part of the year upon ſalt meat; which lays a foundation for the ſcurvy, and other chronical diſeaſes, that renders life very burdenſome, not to ſay intolerable.

drove of beaſts is got within forty or fifty miles of London, the drover may be directed by his employers to halt for ten days or a fortnight: by this means their beaſts will be in better order, when they come to Smithfield, than thoſe whoſe journey is not above 130 or 140 miles.

But to ſhow farther the expediency of fattening our oxen at home, and to put the matter in the ſtrongeſt light, I beg leave to mention a fact which happened about five years ago, when a parcel of lean Welſh oxen, which came from the iſle of Angleſea, were ſold at Barnet near London, and after that ſent a hundred and twenty miles from London to be fattened. By the time they were brought to the graſier's, they ſtood him in ſix pounds ten ſhillings a head. After they were fattened, they were ſent to Stevenage, where they were ſold, one with another, at twelve pounds a bullock; and the graſier ſaid that he never fed any cattle, whether Scots or Engliſh, which anſwered ſo well. I have often heard others, as good judges in theſe matters as any men whatever, ſay, that they preferred the Welſh to all other cattle.

Now, if the Welſh farmers, inſtead of ſending away their oxen lean, would fatten them in Wales, they could never fail of a more advantageous market than all other people whatever; for they would be able to feed their cattle vaſtly cheaper in Wales, than the Engliſh graſiers poſſibly can; and they would buy the oxen for which the Engliſh give ſix pounds ten ſhillings, for five pounds: ſo that if oxen fed in Wales were ſold fifty ſhillings a head cheaper in Smithfield than thoſe of the ſame ſize fed in England, the Welſh graſiers would ſtill be greater gainers than the Engliſh; But an Engliſh graſier, who has four hundred acres of ground in his hands, gets, one year with another, one hundred and twenty pounds by this one branch of his trade. A Welſh graſier, therefore, who occupies the ſame number of acres, might ſtill be a much more conſiderable gainer.

Inſtead

Inſtead then of ſending away our cattle lean, let us not only feed them at home, but buy from Scotland and Ireland, for the ſame advantageous purpoſe.

Thoſe counties in Wales, which are the remoteſt from Scotland, are but a little, if any thing more diſtant from it than the Engliſh counties, in which great droves of Scots cattle are annually brought, and afterwards fattened for the uſe of our great metropolis.

Let us now conſider the advantages ariſing from ſowing clover and rye-graſs ſeeds. They are indeed ſo great, that little or nothing is to be done in farming without them. By laying down a piece of ground, in the manner above mentioned, with clover or rye graſs, or rather with a mixture of both, in the proportion of eight pounds of clover, and half a peck of rye graſs to an acre, the farmer will always be ſure of fine crops, if the ſeaſons are good; for as frequent reſt is by this means given to the land, it muſt of courſe recover its loſt fertility; eſpecially if we take into the account the circumſtances of feeding it off, by which it is ſurpriſingly enriched. By this means the farmer, who may, perhaps, have no great quantity of meadow ground, will have plenty of fine hay for his horſes; and in the ſpring, the clover and rye graſs will come up three weeks or a month before his natural graſs: ſo that as ſoon as his turnips are fed off, his bullocks, which he is preparing for early markets, will live in clover, and not only delight the eye of every ſpectator, but make a great addition to the owner's wealth; and all thoſe who obſerve theſe directions will always be amply rewarded by the grateful earth, which will every year produce them a crop of wheat or barley, oats or rye, turnips or clover: So that if our lands do not, without intermiſſion, furniſh us with crops of grain, or, which is equivalent, large quantities of artificial graſs, or turnips, it is owing to our ignorance and ſloth, and becauſe we do not properly cultivate them.

Saint-foin alſo, as it produces great crops, is a very valua-
e graſs, and ſucceeds better on a dry and ſtrong, than on a
ght and moiſt ſoil. The land ſhould be well ſummer fal-
wed the year before the ſeed is ſown, plowed and harrow-
at leaſt three times, and kept quite clean; the following
ar it may be ſowed in April with barley: immediately after
e barley is ſown, ſow the Saint-foin upon it before you
rrow, and then let both be harrowed in together. When
e barley is carried off, no ſheep, and very little other
ock, ſhould be ſuffered to go upon the land for the firſt
inter; and the ſpring following it muſt be reſerved for hay;
t this firſt crop muſt not be mowed till the flower is almoſt
l off, and the plant beginning to ſeed: the ſucceeding year
muſt be mowed in the full bloom, when the flower is juſt
ginning to drop, and the after-paſture muſt not be fed
ll the latter end of Auguſt, or the beginning of Septem-
r. No ſtock ſhould go upon it after Chriſtmas. Sheep,
is thought, hurt it much at all times. Great care muſt be
ken in the choice of the ſeed; and there ſhould be no
her ſeed, particularly graſs-ſeed, amongſt it. It ſhould
kewiſe be as new as can be procured, as old ſeed will ſel-
om or never grow. Though it does not arrive at perfec-
on in leſs than two or three years, yet it turns to an incre-
ible account; and, by the help of a little manure every
ird or fourth winter, it will laſt twenty years or upwards.

As I have had little or no experience with regard to the
ulture of Saint-foin, I procured thoſe directions from an in-
enious and worthy friend, of whoſe knowledge and ho-
our the reader may with ſafety form to himſelf the higheſt
pinion.

The method of ſowing turnips, barley, clover, and wheat
ceſſively, &c. is a method ſo deſervedly approved in ſome
ounties, that, though the lands in general are now let at ten
r twelve ſhillings an acre, yet the farmers are allowed to
ake, upon a medium, three times the rent of their corn,
e profits of their fat bullocks, ſheep, dairy of cows, and

hogs. A judgment may be formed of the number of acres annually to be appropriated to turnips, barley, clover, and wheat, from this general direction.

Suppoſe a farm conſiſts of two hundred acres of plowed ground, excluſive of old paſture; it cannot be managed to greater advantage than by having fifty acres of turnips, fifty acres of barley, fifty acres of clover, and fifty acres of wheat. It muſt, however, be ſuppoſed, that the farmer makes a ſufficient quantity of muck to ſpread over the clover land; otherwiſe it will be as well to ſow part of it with barley, oats, or white peaſe. Let it alſo be ſuppoſed, that this farm, now under conſideration, is, what is in many places called a dairy farm, where there are fifty or ſixty cows kept: fifty acres of turnips are highly ſufficient for their winter proviſion, and are productive of as much profit to the farmer as the ſummer paſture. By this means the cows will always be kept in good order, without hay, and will be found as profitable in the winter as the ſummer, if that cold ſeaſon be the time choſen by the farmer for them coming in with calf.

I have known many farmers let a dairy of cows, thus managed, for three pounds a year, and ſometmes for three pounds ten ſhillings a-cow, amount to very conſiderable ſums, and very often equal to the rent of the whole farm.

There are ſome inſtances, indeed, where the ſummer paſture ſo greatly over-portions the plowed ground, that the farmer is obliged to ſow almoſt half of it with turnips, to enable him to fodder * his ſtock in winter. In that caſe the method mentioned above is not altogether an eligible one; but in all other caſes it may be imitated near

* A very ingenious and worthy friend writes me word, that ſome farmers in the County of Brecon, who loſt ſeveral bullocks laſt winter aſcribe it to their not bleeding them before they were put to turnips; but this unhappy effect muſt have been owing to ſome other cauſe—perhaps a wet ſeaſon; for it is not the practice of the moſt judicious farmers, I know, to bleed their cattle previous to their turning them into turnips.

nearly as the nature of the farm, and the convenience of the tenant will admit.

Having mentioned a dairy, I would beg leave to recommend the barrel churn, which is in the form of a common barrel, with pieces of wood called daſhes in the inſide to give a check to the motion of the cream. They have irons fixed to each end, and the largeſt of them are turned by two men, after the manner of common grinding ſtones. Some of theſe churns are of ſo large a ſize as to churn four or five ſtone of butter at a time.

This method of keeping a dairy of cows, or fattening of bullocks, or both, is ſo advantageous and neceſſary towards producing good crops of corn and turnips, that one branch cannot be carried on without the other.

But there is another material article, which, as it greatly contributes towards enriching of land, deſerves to be attentively conſidered, I mean the tath of ſheep.

With reſpect to the growing of corn or turnips, the benefit ariſing from the tath of a thouſand ſheep is generally eſtimated at fifty pounds a year; but with regard to theſe harmleſs animals it is to be obſerved, that there are frequently large tracts of land, which lie uncultivated for their feed and paſturage, and which are thought abſolutely neceſſary to continue in that ſtate, otherwiſe it is imagined, that ſuch a number could not poſſibly be kept; but I am of opinion, that if the ground were plowed and cultivated in the manner recommended in this ſhort treatiſe, a much larger number might be maintained; but the number will be in proportion to the improvement of the land, which would not only be a benefit to the farmer and owner, with reſpect to the wool and lamb, but with reſpect alſo to the growth of corn and turnips.

If a ſheep-walk is the property of one owner, excluſive of common-rights, I think there can be no objection to a propoſal for incloſing it. Sometimes, indeed, it happens, that ſheep-walks are upon commons, to which many others have

have a right; and in that caſe they muſt remain as they are, unleſs the ſeveral proprietors agree to the expedient of incloſing; but where there is no objection of this ſort, there are the ſtrongeſt reaſons for adopting the method I have been recommending.

ARTICLE XXVIII.

Of Graſs-Seeds.

[From a Treatiſe concerning the Manner of Fallowing Ground, &c.]

THE great advantages that redound from the ſowing of graſs ſeeds, are ſo well known in all countries, where this method of improvement has obtained, that it is both ſuperfluous and tedious to adduce vouchers for it. And ſeeing that the people of this country have of late years begun to follow the practice of ſowing graſs ſeeds, it is hoped that the ſucceſs which gentlemen have hitherto had in the ſeveral places of the country, in this ſort of improvement, will be ſufficient, without any further argument, to convince every body of the advantages that can be reaped from it.

But in regard that the labourers of this country are generally poſſeſt with an opinion, that every new improvement, brought from foreign parts, is not to be obtained without great labour and charge, which men of eſtates are only able to defray, do therefore look upon this improvement as a buſineſs of more expence than profit; and where any of theſe land labourers have been induced to make ſome experiments of this kind, they have either been diſappointed of their expectations, by bad choice or management of the ground, or elſe have been deprived of the advantages thereof, by want of due care of theſe grounds they have attemped to improve by ſowing of graſs ſeeds: Wherefore, it is hoped it will not be improper, after all that has been wrote upon this ſubject, to ſay ſomewhat with a particular view

to the circumſtances of this country; and to diſcover the errors that ſome have fallen into, and ſhow in what manner this improvement is to be managed with advantage.

When the improvement by ſowing of clover, and other graſs ſeeds, came firſt to be tried in England, the ſame was done at a conſiderable charge, and with no leſs advantage; for they having learned it from Flanders, a rich and fertile country, they believed that they could not well exceed in making their grounds too rich, where they deſigned to ſow it; whereby the produce was ſuch, that the accounts of it, to be ſeen in the writers of that time, appear to be fabulous to the preſent age: But time and experience having taught them, that theſe graſs-ſeeds were not of ſo nice and tender a nature, as at firſt they were thought, they afterwards ſowed them upon grounds in leſs fertile condition; and ſo at laſt came, in place of ſowing them upon their beſt and richeſt fields, to ſow them upon their grounds that had been waſted with tillage, or ſuch as they did not look upon as rich enough for ſowing of corn; in which nevertheleſs, though their profit was not equal to what it was at firſt, yet ſtill their profit was greater than could be expected from any other method of management of thoſe grounds, that were to be laid down to reſt from tillage: For in the firſt manner of treating theſe graſs ſeeds, the profit was greater than could have ariſen by ſowing of grain; and in the laſt manner of treating them, their profit was only greater than what could be reaped from the natural produce of that ground, when it lay Ley. And it is upon this laſt manner of management, that the writers of this age found the rule or direction for ſowing of graſs ſeeds, viz. To ſow it upon ſuch grounds as are no longer in a condition to bear corns. And upon the miſtake of this general rule, is to be charged all the diſappointments that any perſon has met with in this piece of improvement: For we in this country being in uſe to labour our grounds at a much ſmaller charge, and with leſs induſtry, than they do in England

England, are content with a very ſmall return; ſo that we continue to labour our grounds for corn, till it be reduced to a ſtate of almoſt abſolute ſterility, which may be ſaid of ground when it renders no more than threefold; and then ſuch as incline to ſow graſs-ſeeds, begin to employ theſe grounds for that purpoſe: whereas in our neighbouring country of England, grounds are looked upon as unfit to be continued longer in tillage, when they render leſs than five-fold: for, in their way of reckoning, ground in tillage at the leaſt muſt yield five rents; viz. one to ſeed and labour, one to the labourer's family and ſervants, one to the maſter or landlord, one to accidents of tear and wear, death of cattle and loſs of market, &c. and one for the farmer's profit; ſo that when grounds are not able to yield theſe five, they look upon them as proper to be ſown with graſs-ſeeds, by which they become chargeable only with two rents, viz. the maſter's rent and the labourer's profit; which two the field in graſs is more able to defray than the other five when in corn, at the increaſe of five fold. And if this method were followed, no man could fail of ſucceſs: For it may be laid down as a maxim, that a field of ground rich enough to produce five fold, if ſowed with graſs ſeeds, will afford the labourer or proprietor more profit than can be reaped from a crop of any grain at leſs than five fold increaſe, after deduction of ſeed, labour, and other neceſſary expences.

Another reaſon why ſome experiments of this kind are not ſo ſucceſsful, proceeds from an opinion, that graſs being the natural produce of the earth, the ground does not require to be ſo well laboured, and ſo well dreſſed, in order to ſow it with graſs ſeeds, as if it were to be ſown with grain: But ſurely this error proceeds from want of adverting to a very neceſſary maxim in huſbandry, viz. that the produce of any field, whether in graſs or corn, is ſtill in proportion to the labour that has been beſtowed upon it. Beſides, when a field is in tillage, if the labourer ſhall, either

thro' neglect or accident, ſow his grain, without giving it due and proper labour, this defect may be made up next year with a ſmall charge, and a little more induſtry. But it is not ſo in the caſe of laying down a field to graſs, which perhaps is to lye in that condition for ſix or ſeven years; for a neglect or overſight is not to be remedied without a very great charge, and doing the work over again, or elſe foregoing the whole profit that might have been reaped in ſeven years, had the work been done truly and right at firſt.

Wherefore it is neceſſary for the ſowing of graſs ſeeds, that the ground ſhould at leaſt, be it never ſo light, have two plowings, and in ſtiffer grounds three; and if theſe plowings do not bring it to be as ſmall a mould, as is uſually made upon the grounds ſowed with flax or lint, then the ſame muſt be done by cloding it, and other methods of dreſſing, as in flax ground: the firſt of theſe plowings ought to be done before winter: and the deeper the furrow be, the better: and care muſt be taken that it be well water-furrowed, and no water allowed to ſtand upon it. If the ground be a clay ſoil, it will be proper about the beginning of March, or ſo ſoon after as the ground is dry, to croſs-harrow it with a break harrow, which is a big harrow, ſuch as four horſes or oxen may draw; and if a ſandy ſoil, any common iron harrow may do: After which, let it be plowed again, and ſowed with oats, harrowing it very fine; and afterwards let the graſs ſeeds be ſown, and either harrowed in lightly with a timber teeth harrow, or an iron harrow ſtuck full of buſhes; and if the mould be not made ſmall enough with this, let it be cloded and dreſſed as for flax. And it will be found by experience, that any labour that is here required, more than is generally looked upon to be neceſſary for ſowing of oats, will be more than repaid by a more plentiful crop of oats, than the ground would have produced from the ordinary way of management; beſides, it will render the ground of a more evenly ſurface, and eaſier to be moved. It is to be noticed, that oats is the

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propereſt grain to ſow graſs ſeeds with; becauſe, being ſown pretty early, the graſs ſeeds will be ſprung before the heats in May or June; for the ſmallneſs of theſe graſs ſeeds, not allowing them to be covered ſo deep with the earth, they are in very great hazard of miſcarrying, if it happens to be hot dry weather at the time of their firſt ſpringing.

But obſerve, that when a field is to be laid down with graſs ſeeds, and a crop of corn taken therewith, that the grain be ſown much thinner than ordinary, and get its ordinary harrowing four or five days before the graſs ſeeds are ſown. In caſe the ſeaſon proves rainy, that the graſs ſeeds cannot be ſown ſo ſoon after, it is no matter, though the corn be briered two inches high, you may then ſow it, and give it a flight harrowing, or roll it with a roller.

If the ground be of ſo ſtiff a nature, as to require three furrows, in order to reduce it to a proper mould, then it may be proper to prepare and dreſs it for barley; becauſe the year will be farther advanced before ſo much labour can be overtaken; beſides, that grounds of this ſtiff nature cannot eaſily be reduced to a ſmall mould before they be thoroughly dry, which cannot reaſonably be expected in the Months of March or April: let the firſt plowing be before winter; then about the middle of April, if dry, croſs break it, as above directed, and plow it a ſecond time; then croſs break it again; and immediately after, before the ground grow firm again, plow it for the third and laſt time, and ſow the barley and graſs ſeed, as above directed. But it may be proper to delay ſowing of the graſs ſeed, till the barley ſprout, and begin to appear; for the light and flight harrowing that the graſs ſeed requires, will not harm the barley: And after the graſs ſeed is harrowed, and the clods, if any be, broke, let the whole field be rolled, either with a ſtone or timber roller, the heavier the better, even though it require two horſes to draw it. By thus rolling the field it is rendered more firm, whereby heat and drying winds will not have acceſs to harm the tender graſs ſeeds

d the barley coming quicker up than any other grain, ll ſoon afford them a further protection. Thus far for e method of dreſſing the ground, and ſowing of the graſs- eds, which may be ſummed up in theſe two particulars: rſt, that they be not ſowed upon ground in worſe condi- on, than what may yield three-fold increaſe, in an ordi- ry good ſeaſon. 2dly, That the ground be well labour- , and the mould made as ſmall as is ordinary for ſowing flax.

Next to be conſidered is, the ſeveral kinds of graſs- eds proper to be ſown, and the reſpective quantities in portion to the extent of the ground.

The great red clover and rye graſs grow in either light ſtiff ground, and will proſper in proportion to the ſtate fertility that it is in: Hope clover does beſt in light ounds, or ſuch as are gravelly and open, but never comes great height: If clover is to be ſown alone, what is ſa- d on the expence of ſeed is loſt; though in grounds that exceedingly rich, a leſs quantity will do than in grounds at are poorer: But on ground of the richneſs above- entioned, it is adviſed not to ſow leſs than twenty pound ight to the acre of either red clover or hope clover; and either of theſe two clovers are to be ſowed along with graſs, twelve pound of clover, and three buſhels of rye aſs ought to be allowed to each acre; if rye graſs is to be wed alone, five buſhels to an acre ought to be allowed.

If the grounds to be ſowed with graſs ſeeds are deſigned lie in graſs for any number of years, either for hay or ture, without regard to the ſaving the ſeed of any parti- ar graſs, then it would be very proper, with all or any the above mentioned graſs ſeeds, to ſow the ſeeds of od upland or lay hay, particularly the corn graſſes of all nds, whereof there is a great variety, and under which nd are comprehended all theſe graſſes that ſhoot with a ng ſtalk, and bear a head or ear; as alſo the ſeed of the hite clover, and narrow leaf planting, which laſt is known

among the children by the name of head men; and the ſeeds of any other graſs that is obſerved to come up natu-rally upon the ground where it is good. The reaſon why this mixture is propoſed is, that where clover is ſowed by itſelf, or with rye graſs, in three or four years it generally goes out, and leaves either the field very bare, or elſe a thin ſcanty crop of rye graſs, and ſo continues for ſome two or three years, till the paſturing of cattle, or the appli-cation of ſome manure, give the rye graſs new ſtrength, or brings up ſuch graſſes as are natural to the ſoil. But where theſe natural graſs ſeeds are ſowed alongſt with the clovers and rye graſs, as they decay, the natural graſſes take place and grow ſtronger: whereby, when the clover is gone, there will remain a good cloſe ſward, fit for paſture which will daily improve thereby; for if the ground be rich enough, it will afford very good hay.

What remains, is to lay down ſome proper directions for the management of theſe grounds ſown with graſs ſeed. It cannot be doubted, but if theſe grounds be incloſed, there will be more profit reaped by them than if left open: But if they be not incloſed, all hope of advantage muſt evanish unleſs they be kept carefully from all ſorts of cattle, fro winter after ſowing; and the ſpring thereafter theſe fields muſt be ſaved for hay, which may be ready for mowing about the middle of June, and then let them be laid up for a ſecond crop; and in a month or ſix weeks thereafter will have made a conſiderable advance, and the clover will be again in the flower: But in regard that the too often cutting of it impoveriſhes the ground, this ſecond crop, in place of hay, ought to be paſtured till Martinmas; after which time it ought to be carefully kept from cattle, eſpe-cially from ſheep: In the ſpring of the ſecond year, if the ſeaſon prove forward, it will be fit for paſture by the fif-teenth of April; at which time cattle may be put in, and continued upon it to the fifteenth or twentieth of May, after which it may be laid up for a crop of hay, which will

be ready to cut by the latter end of July; after which, if it be kept from cattle, it will be very good for paſture about the middle or latter end of October, from which time it may be paſtured to Chriſtmas; after which it is to be laid up till April thereafter, and to be managed as laſt directed thro' the reſt of the years, until the clover and rye-graſs run out; after which it is to be turned into paſture, till the ground be found to be ſufficiently rich for tillage, for that a greater benefit may be expected from tillage, than by keeping it for paſture or hay.

By the above method of management, there is only one crop of hay to be taken, which may be reckoned the product only of two months; and the produce of the other months, being paſtured with cattle, gives an yearly ſupply of manure to the ground, by which the field is enriched: Beſides, by paſturing the ſpring crop, as directed, after the firſt year, the fodder of a month or ſix weeks is ſaved; and after the oat ſeed is over, the cattle will by this paſture be in a condition to work the bear land upon the graſs, which will ſave no ſmall charges; and the laſt, or harveſt crop, will prove a great ſaving of the fodder in the beginning of winter, and keep ſuch cattle as it is able to maintain in a tolerable good condition, after the graſs of the ſtubble is over: And beſides theſe advantages, the hay or paſture of the ſummer crop will be more profitable, than any crop of corn that could reaſonably be expected from that field; and after being ſix or ſeven years managed in the manner above directed, it will be as fit for corn as any field dreſſed or dunged with much greater expence: Tho' at the ſame time it muſt be allowed, that if it were allenarly paſtured for the number of years above mentioned, the field would be rendered much richer. But all advantage that can ariſe to the field from paſture will be loſt, unleſs the ground be incloſed, ſeeing without that, the cattle cannot lye and dung upon it.

If any perſon want to ſave the ſeeds of theſe graſſes, it will

will be proper to ſow each of them by themſelves in ſome portion of ground, in proportion to the quantity he wants to have; becauſe they do not all ripen at one time, except the corn graſſes and narrow leaf-planting, the rye graſs excepted, which belongs to the tribe of corn graſſes. As to the time of cutting for the ſeed, no rule can be given, but when they are ripe, which may be known by rubbing of the heads, and ſeeing when the ſeed is full and firm: And after it is cut, let it lye a day or two in the ſwath, and then thraſh it in a dry day upon boards laid upon a cloth in the field; becauſe the rye graſs, and all the other corn graſſes, are apt to ſhed the ſeed, as alſo the hope clover: But as to the red and white clover, they do not run that riſk; ſo that they may be made into hay, and thraſhed at what time the ſeed is wanted.

Nota, That when clover is to be cut for hay, without regard to the ſeed, it is to be done when it is fully flowered, and before the flowers begin to wither and decay: If it be to be cut for ſeed, let it be full ripe, which will be known in the manner above directed; viz. When upon rubbing of the head, the ſeed comes out hard, and yellow, or purpliſh; and it muſt be thraſhed upon dale boards or planks with flails, whereof the ſouples are ſtraight and ſmooth; becauſe the ſeed being very ſmall, and ill to ſeparate from the huſk, none of it will part with the head or huſk, but where the flail immediately touches.

As for the hope clover, the ſeed of it is known to be ripe, when the little huſk in which it grows is black; and each ſeed being ſeparate, and in a proper huſk by itſelf, it is not to be ſeparate therefrom, without being run thro' a mill after it has lyen ſome time in a well air'd loft till it be ſufficiently dryed. But this labour of milling may be ſaved, where the ſeed is not to be expoſed to ſale, but uſed by the proprietor, in ſowing of this and the former in the huſk.

ARTI-

ARTICLE XXIX.

Of the Deſtruction of Corn by Pigeons.

[In a Letter to the Publiſher.]

MY deſign in this Letter is, to mention what an intolerable loſs the farmers in this country ſuffer, from the vaſt number of pigeon houſes allowed to be kept by every one of a certain number of merks valued rent. This needs no demonſtration. The vaſt ſwarms which alight amongſt the corn, either in ſummer when ripening, or in harveſt when in perfection, may be ſufficient evidence to any ſtranger; and a very expenſive proof it is to every farmer who is ſituated in the very circle of pigeon houſes. They truly deſtroy a vaſt quantity. So great is their digeſtion, that it is reckoned they are capable to eat their own weight of wheat, peaſe, or barley, per day, of all which, eſpecially the two firſt, they are remarkably fond. It is very certain, that they eat and digeſt ſmall ſtones, which ſometimes in ſummer make the greateſt part, if not the whole, of their food. From this circumſtance, if we knew the number of pigeon houſes in Eaſt Lothian, and the average of their contents, we might perhaps gueſs pretty nearly the whole damage, if it be poſſible to compute it. But without enquiring ſo minutely into theſe circumſtances, let us but conſider, that all the advantages ariſing from pigeon houſes are partial and limited; the diſadvantages, general and extenſive: That the advantages conſiſt chiefly in the yearly rent and the dung which they produce; and theſe are confined to the Laird, or at furtheſt to a neighbouring tenant: but the diſadvantages extend at leaſt to all the tenants who raiſe victual upon their lands. The yearly rent may ſerve as a pitiful augmentation to ſome conſiderable revenue, and the dung for manure to a few acres of the lands of the wealthy proprietor. But are theſe ſufficient

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to lie in the ballance againſt the common intereſt of a country? No; they cannot. So much then for the grievance: but how ſhall it be redreſſed, unleſs the legiſlative body think it an object worthy of their attention, as it undoubtedly is, and reverſe the former law, which it ſeems has ſet no limits to the indulgence granted to little Lairds. Hence do they, in place of contenting themſelves with a few pigeons for the uſe of the family, erect two or three pigeon houſes, and let them in tack to any of their tenants, and ſometimes even keep them in their own poſſeſſion, tho' in the midſt of their tenants land. There is a plea just now, it is ſaid, before the Lords of Seſſion, which took its riſe in this county, as follows: A certain Laird in the eaſtern parts of Eaſt Lothian, had two pigeon houſes, and one of them let in tack to a neighbouring tenant of his own. The pigeons, it ſeems, had made great havock among ſome peaſe, &c. of an adjacent tenant. The tenant, by force of arms, drove them from his fields. However poor creatures! not ſenſible that their number was ſtill diminiſhing, every attempt they made at theſe tempting fields, and that they were each of them in the moſt eminent danger of their lives, they ſtill continued to make incurſions to theſe fields, but were as often repulſed, with the loſs of ſome few of their numbers. The proprietor at length interpoſed, begging that the farmer would be more diſcreet, telling him, "That theſe pigeons were his "property, as well as any thing he had; that it was plain"ly robbing him of it, as long as he perſiſted in the "practice of ſhooting them; and that he was very well "come to drive them from his fields in whatever manner "he pleaſed, provided he did not kill nor wound them." The farmer ſtill remained obſtinate, continuing the ſame method of defending his corns, telling the Laird; "That "he ſaw no title which his property had to be ſupported "upon his grain, which was the only reward he could "expect for all his toil and induſtry; and which, he could

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" aſſure him, was but too little, conſidering the vaſt rent he " was obliged to raiſe from theſe ſmall fields; and that, in " ſhort, he was fully determined to protect his property from " theſe vermin in the ſame manner he had hitherto done; " and if the law (which the other propoſed to him,) can be " ſo unreaſonable, as to find me in the fault, there is no help " for it; but ſure am I, that ſuch a deciſion muſt be very un- " favourable for the tenants in general." Theſe, it is ſaid, are the ſubſtance of the converſation which paſſed upon that head; and ſuch is the ground of the plea, which the Laird is juſt now proſecuting: How it will end we have but little gueſs.

My time is almoſt gone, and my paper ſhort, elſe I might ſhow the ſtill more dreadful effect of ſuch inconceivable numbers of crows which infeſt this country, and of which Binning wood at Tynningham may juſtly be reckoned a principal ſource. They deſtroy the corns at almoſt all ſeaſons. In particular, when the wheat makes its firſt appearance, they come in ſuch vaſt ſwarms, that in a very few hours they could deſtroy the whole ſeed upon the field where they alight. Now this ſeems more eaſily remedied than the former evil *.

I am, SIR,

Eaſt-Lothian, Feb. 17. 1773.

Yours,

ARATOR.

* Rooks, if they infeſt your corn, are more terrified, if in their ſight you take a rook, and plucking it limb from limb, caſt the ſeveral limbs about your field, than if you hang up half a dozen dead rooks in it. LISLE.

But Mr TULL ſays, Among the many contrivances to frighten rooks, as feathers ſtuck up, limbs of rooks ſcattered about the ground, dead rooks hung on ſticks, the gun, or a boy to halloo or throw up his hat or a dead rook in the air, I have found the laſt to be the moſt effectual.

Eſtimate

Eſtimate of the Deſtruction of Corn by Pigeons.

THE deſtruction and waſte of corn from pigeon houſes has long been complained of. Mr Hartlib, in his *Legacy of Huſbandry*, which was publiſhed in 1655, gives a calculation, from which he concludes, that the loſs and deſtruction of corn in England by pigeon houſes was no leſs than L. 571980 Sterling, yearly.

It is there ſuppoſed, that there are three pigeon houſes in each pariſh; that every houſe had two hundred holes, which are bred in; and in every hole a pair of pigeons which breed, beſides thoſe which have no mates and do not breed, of the number of which no notice is taken, tho' they devour and ſpoil much corn.

It hath, and may be proved, that a pigeon hath had at one time in her crop about an Engliſh pint of wheat: Now as a pigeon feeds thrice a day, from thence conceive what every pigeon ſpoils, eats, and devours in a year. But ſuppoſing that a pigeon doth eat but half a pint a day, for the ſpace of ſix weeks in ſeed time, and ſix weeks in harveſt, beſides what he ſpoils by beating much down, the quantity is ſtill very great, and far out-ballances all the profit made by pigeon houſes.

Now let us apply theſe Data to Scotland, and ſee what miſchief they do with us. And, in order to give the pigeon houſes fair play, we ſhall take the Scots mutchkin for our ſtandard, which is conſiderably leſs than the Engliſh pint. Now the two hundred mutchkins of corn eat every day by the four hundred pigeons, which we allow to each pigeon houſe, for the ſpace of twelve weeks or eighty four days, is 16800 mutchkins; And according to the proportions betwixt the mutchkin and bear firlot laid down by Mr Gray, that comes to thirty three bolls, three firlots and odds for each pigeon houſe; and admitting three pigeon houſes to every pariſh, the quantity conſumed by them in every pariſh is one hundred and one bolls one firlot, which

e ſhall call one hundred bolls neat. The number of pa-iſhes in Scotland is nine hundred and upwards, the con-mption then will be over all Scotland upwards of 90,000 olls of grain, which, computing it at thirteen ſhillings nd four pence per boll, is no leſs than L. 60,000 Ster-ng yearly.

It may be urged by the advocates for pigeon-houſes, that he one half of the pariſhes in Scotland raiſe no victual, nd conſequently have no pigeon-houſes; That may be afely admitted, and the total of the corn conſumed by pi-eon-houſes will notwithſtanding ſuffer no diminution; for he want of them in theſe pariſhes is fully made up by the uperabundance of them in the corn countries. In theſe e find, that no proprietor, poſſeſſed of the qualification equired by law, to wit, being poſſeſſed of ten chalders of ictual rent, has overlooked the advantages given him by he law. And beſides, many old pigeon-houſes, which ad been conſtructed before that law was framed, and ave acquired a right by preſcription, are ſtill ſtocked with igeons; and there are many, which are neither authoriſed y preſcription nor by law. It would be eaſy to point out many pariſhes that ſupport upwards of twenty pigeon hou-es; theſe will make up for the deficiency of others; and he calculation ſtand good; eſpecially when other conſide-rations are taken: as firſt, many pigeon-houſes during the breeding ſeaſon will yield fifty or a hundred pairs a week; theſe muſt be poſſeſſed of many more than two hundred breeding pairs. 2*dly*, What they pick up and eat in ſeed time is attended with a very great loſs: For ſuppoſing each grain would have yielded only one ear; and that ear to have yielded only ſixteen ſingle grains, the loſs in the crop is no leſs than 720,000 bolls or L. 480,000 Sterling. And, 3*dly*, At that ſeaſon, when every grain that is eat by them is a loſs of ſixteen at leaſt to the farmer at harveſt, they feed more voraciouſly, having their young as well as them-ſelves to ſupport; ſo that they may well be allowed to eat

a great deal more than the mutchkin formerly allowed them. So that if the real loſs ſuſtained from pigeon-houſes were to be fairly known, it would amount to a ſum that would be amazing: And, in theſe times of ſcarcity, demand the moſt ſerious conſideration.

A method of preventing Pigeons from deſtroying Peas, Vetches, &c. when firſt ſown.

[From the Muſeum Ruſticum, Vol. II.]

LAſt year I ſowed, and had five acres of peas, or ſhould have had, at leaſt; for ſoon after they were ſown, being greatly infeſted by a rich neighbour's large flock of pigeons, much of the ſeed was devoured. I did all I could to fright them away; ſhot at them with powder (for I dared not to kill them, as the dove-cot they belonged to was a legal one, and my neighbour but a crabbed ſort of an old fellow): I ſet a boy to watch them, I put up ſcare-crows, but all in vain; and I ſoon perceived there was a great probability of my whole crop being deſtroyed by theſe furious enemies.

My next ſtep, therefore, was to apply to my neighbour, and beg of him to feed his pigeons at home for a few weeks: this he refuſed to do, as he ſaid, on account of the trouble, though I offered to contribute a few buſhels of off-corn to do it withall.

My caſe grew now quite deſperate, and I knew not, for ſome time, which way to turn myſelf for a remedy: at laſt I applied to a bird-catcher in the town, who had a very large pair of ſpring nets, and who undertook, for a crown, to catch as many of them for me as I would. I ſtruck the bargain immediately, and we ſoon baited the ground properly to attract them to a particular part of the land. My companion made good his word, for in the ſpace of two days he caught me above ſixteen dozen; which I let fly again,

again, but not before I had cut off their tails, that their owner might know where they had been viſiting.

This cutting of their tails was the only thing I could do to protect myſelf from their depredations: it cauſed them to keep at home, for they were no ſooner returned to the dove-cote, but it became a priſon to them; for they cannot bolt, or fly out of the tops of the cote, but by the aſſiſtance and ſtrength of their tails.

My neighbour, at the two days end, finding his flight of pigeons ſo much thinned, and being told that I ſhould ſay I would do for them, charged me with deſtroying them, and threatned to proſecute me as the ſtatute in that caſe directs; but I knew my innocence, therefore defied him to do his worſt. He went immediately to a lawyer, who told him, that nothing could be done without evidence: My neighbour then went home, and taking with him one of his men, to witneſs how many pigeons had been deſtroyed within two days, went to the dove-cote, when opening the door, he was not a little ſurpriſed to find near two hundred priſoners fluttering about without their tails, and ready to eat one another for hunger.

When he found how I had ſerved him, he ſent for me, and with a leſs haughty air than he had before aſſumed, requeſted I would not disfigure any more of his pigeons, promiſing to feed them regularly every day till my peaſe were out of danger. By this contrivance I ſaved near half my crop, and thought myſelf very well off.

My reaſon for ſending you this account is, that others may be taught how to defend themſelves on a like occaſion. I ſuppoſe other means may be found of catching them beſides a net.

Of

Of the Advantages from Pigeons eating up the Seeds of Weeds.

IT would be unfair to the gall-leſs pigeon, after pleading againſt it, not to ſet forth what may be urged in its behalf. The Reverend Mr Comber, an Engliſh Clergyman, a correſpondent of the Muſæum Ruſticum, writes the following P. S. to a letter, Vol. II. p. 254.

" Yeſterday a gentleman, near eighty, told me a ſtory, " which ſo plainly proves the *amazing uſefulneſs* of pigeons, " not only by their *dung*, but even by their devouring fa- " culty, to produce a good wheat crop in ſome places, that " I muſt think it well worth a record in your *Muſeum*.

" Above forty years ago this gentleman coming to *Tux-* " *ford*, in *Nottinghamſhire*, in his way to, or from *London*, " aſked the maſter of the inn, if he had not a pigeon pye, " as uſual in that ſeaſon; *Tuxford* being as famous for " pigeons as for a ſtrong clay, and its produce, wheat. " The landlord anſwered, that the farmers being perſuad- " ed that every pigeon eats a load of corn in a year, had " agreed to deſtroy their *courts*. But, added he, we find, " that without pigeons we can grow no corn, and muſt " re-people our *courts* with all poſſible expedition. The " gentleman being curious to know the reaſon, the land- " lord continued, Our ſoil is ſo full of the ſeeds of *ketlocks*, " that they now overſhoot and deſtroy our corn, and we " find by experience that our pigeons preferred theſe ſeeds " to any corn whatever; and that in deſtroying of our pi- " geons we have run a great riſk to deſtroy ourſelves.

" 'Tis highly probable, that the ſeeds of many other weeds " are in like manner preferred by pigeons to any corn, juſt " as cats prefer the fleſh of mice to any other; and that in " many places we ſhould have much better crops of wheat, " *&c.* if we encouraged pigeons more.

" It is worth the while to try in what degree pigeons are " fond of ſeveral ſeeds of weeds* ; and in particular, how " they

* We recommend this matter to the conſideration of our ingenious correſpondents.

they ſtand affected to the ſeed of *melilot*, which gives ſo diſagreeable a taſte to the fineſt wheat, as to render it in a manner uneatable, at the ſame time that it is ſo ſmall as ſcarcely to be ſeparated from the corn. By the bye, how cautious ſhould the farmer be, leſt, in buying of ſeed wheat, he buy the ſeeds of weeds, which may coſt him endleſs pains to eradicate? I would adviſe every one, before he ſows any wheat, to uſe ſome of it in puddings, &c. as well as in bread, and to engage ſome perſon of exquiſite taſte to give his opinion."

And Mr LISLE gives the following two inſtances to the ſame purpoſe.

"Towards the end of June, I entered my pigeon houſe, to ſee, in caſe there were any young ones, what ſeeds they had in their crops: I took half a dozen young ones, and beſides a little corn, I found much charlock-ſeed, and the ſeeds of the common creeping crowfoot in their crops; and afterwards obſerved great flocks of pigeons to light in the fields, where that plant grew plentifully, at the time of its ſeeding. In July I had a pigeon killed in the fields, and opened his crop, which was full of the beforementioned crowfoot ſeeds and fumitory ſeeds, and nothing elſe, ſave half a dozen bud flowers of charlock and two or three oats; I obſerved they were very voracious of theſe ſeeds; for I had three acres of arable, which had laid down to graſs two years, and that had more of this crawfoot in it poſſibly than my whole farm beſides, in which my whole flight of pigeons lay all day, and in a piece of wheat near my houſe that had much fumitory in it: You may ſee where theſe plants grow in fields near pigeons, the ſeeds picked off: They are therefore of great uſe in ridding the fields of weeds."

ARTI-

ARTICLE XXX.

An excellent Remedy for the Scab in Sheep.

[From the Muſeum Ruſticum, Vol. II.]

I Need not tell you, I preſume, that the cauſe of the ſcab in ſheep is a tedious length of wet weather: As to the conſequences, they are already pretty well known.

I imagine your readers will not be diſpleaſed if I ſhould, with your aſſiſtance, communicate to them a remedy for this diſorder, which I have ſeveral times tried, and almoſt always found to anſwer extremely well.

Some men, whom I have known to breed and feed a great number of ſheep, have been groſly miſtaken in their comprehenſion of the nature of this diſtemper, which they raſhly judged to be merely cutaneous; whereas when a ſheep has the ſcab, the blood is always more or leſs affected by it: therefore the outward applications which are in general alone reſorted to for a cure, do for the moſt part more hurt than good, by driving in the eruption, and making it fix on the internals, thereby often occaſioning the death of the animal.

Now the true way to treat this diſorder is, firſt to give the animal ſomething inwardly to drive out the eruption; then comes, with propriety, the outward application which completes the cure by killing the ſcab.

When a farmer has any of his flock afflicted with the ſcab, let him attend to the directions which follow.

Take a galloon of ſoft well or pond water, which divide into two equal parts: in one of theſe parts diſſolve eight ounces of old hard ſoap; to which, when it is diſſolved, add two ounces of ſpirits of hartſhorn and ſeven ounces of common ſalt, with four ounces of roll brimſtone, both to a fine powder and ſifted: then take the other part of the water, in which put two ounces of tobacco leaf, and

f white hellebore root: boil this ſecond part till you ave a ſtrong infuſion, after which ſtrain it clear from the eaves and roots.

When you have got thus far in the proceſs, take that art of the water firſt mentioned, and ſet it over the fire; t it boil for about half an hour, keeping it continually irring with a wooden ladle during that time: in the mean me heat again the other part, in which the tobacco and ellebore were infuſed; and when it is hot, mix the two arts gradually together over the fire, keeping the mixture ontinually ſtirring till it is taken off the fire, which ſhould in about a quarter of an hour: when it is quite cold, t it be put into a ſtone bottle, in order to its being kept a cool place for uſe.

Then take four quarts of new ale or beer: put into it elve ounces of common ſalt, two ounces of bay ſalt, d eight ounces of pounded nitre, together with twelve nces of pounded roll brimſtone: ſet them over a gentle e, and when the ale boils, take off the ſcum; let it boil r about half an hour; after which ſet it by till it is cold, d put it into a ſtone bottle for uſe.

When you are ſo far prepared, take one quart of ale; it on the fire; mix into it, by degrees, three ounces of ur of brimſtone; when it is juſt ready to boil, take it f the fire, and let it ſtand to cool; and when it is only od warm, give this quantity inwardly to three ſheep, hich is to be repeated every ſecond day, till they have had ree doſes. This will drive out the diſorder, when the ſt mixture is to be rubbed on the diſtempered parts; and o days afterwards, the ſecond; and ſo alternately for out eight or ten days, till the cure is effected: ſometimes o rubbings will be ſufficient.

I muſt obſerve, that all theſe mixtures will be beſt boiled well glazed earthen or iron pots.

ARTI-

ARTICLE XXXI.

Of the Rot and Braichan in Sheep.

[In a letter to the Publiſhers.]

AFTER the compliments which you have been pleaſed to paſs upon my former letter, and requeſting the continuance of my correſpondence, it would be ungrateful and unworthy in me not to fulfil my promiſe. [No IV. p. 190.]

The diſeaſes, I obſerved, which rage in the folds are, the Scab, the Rot, the Braichan, the Sturdy, and the Sickneſs. The firſt of theſe we have already diſcuſſed. The ſecond in order is the Rot, which, I apprehend, is a plain conſumption: The lungs decay; the feeble frame of the animal is ſhaken with a cough; and the body droops and languiſhes under infirmities and ſymptoms, very like theſe that attend this fatal diſtemper in the human ſpecies. If this diſeaſe is not very far advanced, feeding on turnips is an abſolute cure; for I have known the experiment often made with ſucceſs. This diſtemper is moſt frequent in variable ſeaſons; quick changes from froſt to thaw, and thaw to froſt; bluſtering winds and heavy rains greatly contribute to it: Soft and rich paſtures, eſpecially if they are overflowed with water, I have known to rot the ſtrongeſt heath-bred ſheep, in the ſpace of a year; and therefore I would adviſe all gentlemen, who feed ſheep on ſuch grounds, to fatten and ſell them as ſoon as poſſible, and never pretend to keep them three or four winters. I cannot ſay, if there is any other certain cure for the Rot than turnips: I have good reaſon to think, that it is a more effectual remedy for ſheep, infected with this diſtemper, than aſs milk is for the rational part of the creation. The only objection I can ſee to this cure is, that, like many others, it is difficult to be gotten. I am clearly of opinion, however, that in many of our extenſive ſheep farms it

different places of the nation, half an acre of turnips might be raiſed, which would be ſufficient for this laudable purpoſe. This would be one great advantage among many others that might be mentioned, reſulting from two or three acres incloſed on every large ſheep farm, which might be divided into ſeveral ſmall plots as occaſion required.

The Braichan, another very pernicious diſeaſe, is, I conjecture, of nearly the ſame nature with the flux in rational animals. It chiefly infects ewes that are milked or are ſucked: It is occaſioned by their being chaced by dogs, or overheated with running, and likewiſe by being toſſed and tumbled in boughts or folds. This malady rages in Auguſt and September, and begins to abate when the cold weather and froſts commence in the latter end of Autumn. I have heard, that waſhing them is a cure; for which reaſon, as our countryman THOMSON elegantly deſcribes,

They drive the troubled flocks, by many a dog
Compell'd, to where the mazy-running brook
Forms a deep pool; this bank abrupt and high,
And that fair-ſpreading in a peebled ſhore.
Urg'd to the giddy brink, much is the toil,
The clamour much, of men, and boys, and dogs,
'Ere the ſoft fearful people to the flood
Commit their wooly ſides. And oft the ſwain,
On ſome impatient ſeizing, hurls them in:
Embolden'd then, nor heſitating more,
Faſt, faſt, they plunge amid the flaſhing wave,
And, panting, labour to the farther ſhore.

I have quoted theſe beautiful lines to relieve the mind of the reader on a dry ſubject; and the more willingly, becauſe they were written by one who was a great admirer of the paſtoral life. To cure this violent diſtemper, I have likewiſe been informed, that milk has been poured into the ſickly animal, but whether this remedy is effectual or not, I cannot pretend to ſay. I am inclined to doubt its ſucceſs: However the experiment is ſimple and eaſy to be made. Aſtringents would, in all probability, be beneficial,

if we may reaſon from the analogy that there is amongſt animals. I hope ſome of your friends, who have had better opportunities than I, animated by the love of their country, will tranſmit to you their ſentiments on this ſubject. In my next I ſhall finiſh what I propoſed. Mean time, I am, SIR,

Your moſt humble Servant,

P. P.

ARTICLE XXXII.

The advantages of alternate White and Green Crops.

[In a Letter to the Publiſher.]

IF you think the following worth inſerting in your *Scots Farmer*, you may do it

The Flanders Agriculture of alternate white and green crops, is now pretty well underſtood amongſt the ſpirited farmers in Scotland. About Aberdeen it has been long practiſed; and they have there brought it to greater perfection than any where elſe. They there uſe many different kinds of green crops; turnips, carrots, cabbages, potatoes, lint, clover, beans, peaſe, &c. and often have two crops in the year. It were to be wiſhed, that this plan of culture were more univerſal, both as a national and private advantage. Thereby more wheat would be raiſed at a ſmaller expence; more winter food for cattle, to the ſaving of corn; and in general better crops of every kind of grain, and much expence of keeping horſes and ſervants, upon the old ſyſtem, ſaved. In order to promote this practice much dung is neceſſary; but, in moſt caſes, that is provided for by the ſuperior number of cattle a farm can maintain: and there is likewiſe in Scotland acceſs to many adventitious manures, as this country is interſected with firths and rivers. Lime is to be had in moſt places; moſs and peat aſhes in other places; marle in many places; and

and burnt clay is alſo a good manure for one crop of barley and clover, and made at a cheap rate; ſo that it may be ſaid, that it is for want of ingenuity in moſt caſes if a farmer wants manure.

Next to manure is, attention to the draining and tillage: And here the advantage is greatly in favours of the alternate crops, as the ſeaſon of ſowing and planting is ſo much divided, that one thing never comes to interfere with another in point of time and ſeaſon, and thereby fewer horſes and ſervants can manage a farm of the ſame extent, eſpecially as moſt of the tillage can be done with two horſes, and a great part of it with one horſe.

And I may fairly maintain, that three fourths of a given number of acres will produce more corn than the four fourths in the old way, and one third of horſes and ſervants ſaved, beſides the ſaving in the quantity of ſeed, and the farmer has his green crops into the bargain.

Turnips have been long uſed as a winter crop, and with great ſucceſs, in ſoil proper for it: Cabbages are now more uſed for that purpoſe than formerly; and of this ſort the red Aberdeen cabbage is to be preferred, as it is more hardy againſt the froſt, grows as large as the white, and anſwers in more ſoils. Cabbages have this advantage, that they will do in ſoils too wet and ſtrong for turnips. In ſoils which are too high for either turnips or cabbages on account of froſt and ſnow, I would adviſe the *red Scots kaill*, as the moſt hardy plant yet known in this country. They talk of a Swediſh turnip, a native of the moſt northerly climates; but the experience of it is not yet ſufficiently recommended to the practical farmer, till it is proven by the experience of ſuch gentlemen as chuſe to try it.

To ſecure winter food for cattle, it would be adviſable to have ſome cabbages to laſt till Chriſtmas; then turnip as long as they will ſtand; and laſtly, red kaill, or perhaps the Swediſh turnip, till the end of May; and the ground they ſtand upon will then be cleared time enough to take

a crop of barley and clover. Another advantage of this ſyſtem of agriculture is, the ſuperior quality of the grain, as every farmer knows, that clean land produces more and better corn than what grows amongſt weeds or water.

The laſt thing I ſhall mention in favours of this culture is, the great ſaving in graſs fields for ſummer paſture; as ſix acres of clover cut for the cattle will go as far in feeding beaſts in the yard, as eighteen acres will do in the paſture field; whereby the farmer has twelve acres more to employ in tillage, and makes as much dung in ſummer as in winter.

I ſhall conclude, by obſerving, that the more ingenious the farmer is in providing litter through the ſummer and harveſt for his cattle in the winter, the more beaſts he will be able to keep, and the more dung he will make. For this purpoſe, let him look out for fern, ſeggs, bent, ruſhes, cuttings of hedges, leaves, weeds before they ſeed, and ſuch like; and of ſuch as he can come at, lay up a ſtock for the winter, and if any of his neighbours is ſo fooliſh as to ſell his ſtraw, let him buy it.

I am, SIR, Your moſt humble ſervant,
January 28th, 1773. A FARMER.

ARTICLE XXXIII.

The advantages and Profit of Incloſing.

[In a letter to the Publiſher.]

IN my former letter [p. 182.] I laid before you a ſhort plan how, in my opinion, a farm ſhould be divided and croped, to the beſt advantage, ſo as ſtill to make it better; and yet at the ſame time, to receive profitable crops both of corn and graſs from it: But it muſt be underſtood, I meant an unimproven farm, conſiſting moſtly of Outfield land, all arable, or proper to be made ſo. I ſhall, in this, make ſome obſervations upon the utility of incloſing, which is

a favourite topic of mine, and I think well deſerving the utmoſt attention being paid to it both by landlord and tenant.

Before the farm is incloſed, it cannot, with propriety, be called one's own; for it is ſtill expoſed to be injured by all around it, let the poſſeſſor be as careful as poſſibly he can to defend it; and likewiſe, no improvements can be executed with proper ſucceſs, until the field is ſufficiently fenced, eſpecially if it is intended to be laid out in graſs; becauſe the better the field is prepared by ſummer-fallowing, the more eaſily it will potch and ſpoil in winter, when cattle are ſuffered to go upon it; and without incloſing, it is next to impoſſible to preſerve it at all times, either from the cattle belonging to the farm, or from thoſe of the neighbourhood; and likewiſe, the finer the appearance of the graſs is, the more difficult it will be to preſerve it, as it will prove a bait to draw the whole cattle in the neighbourhood to deſtroy it. And I can aſſure you from repeated experience, when once a field is potched with cattle, except it is very dry land, it will never recover it, although it has been laid down in the fineſt order you can poſſibly imagine, ſuppoſe it were to lye in graſs for twenty years together.

Another advantage ariſing from incloſing is, that you can turn your corn fields at any time you chuſe into graſs; and having done ſo, can uſe it in any manner you think will be moſt profitable, either by keeping it in hay, or running it with cattle for feeding; or if not ſo fit for that, with milk cows; and then you may manage their milk in the dairy way, which is both very profitable to the farmer, and very beneficial to the public. And you can likewiſe paſture ſheep upon it, if your fences are proper for keeping them; which, in my opinion, is the moſt profitable way you can conſume it, conſidering the richneſs of their dung along with the other profits ariſing from them: theſe, in my opinion, will ballance the profits ariſing from cattle; however, I never would adviſe to paſture with ſheep only; I would likeways recommend both cattle and horſes along with them, as they

they eat the graſs more evenly, every kind of them feeding where the other tathes.

Another advantage ariſing from incloſing is, that it ſaves the expences of herding; and at the ſame time, the cattle thrive much better when going at their eaſe and pleaſure both day and night; and likewiſe, the farmer has it in his power to keep his graſs as good as he chuſes; whereas, if his fields were open, his neighbours would prevent him, let him be as attentive as he will.

I ſhall, at this time, only mention one advantage more, among the many that might be adduced in defence of incloſing; which is, that it adds, at a modeſt computation upon an average, at leaſt a fourth part of the value to the land which is incloſed. I ſhall ſuppoſe an open field to be worth fifteen ſhillings per acre; I think it will be allowed by perſons who know the advantages that accrue from incloſing, that the ſame field will be as well worth twenty ſhillings when ſufficiently fenced, and it is likewiſe my opinion, that twenty ſhillings will incloſe one acre, when the parks are from fifteen to twenty acres of extent, I mean with ditch and hedge.

I ſhould now recommend the moſt proper method, in my opinion, for forming and throwing out the ditches, and likewiſe for training up the young thorns; but that has been done very accurately by your correſpondent Mr W. B. from Eaſt-Lothian, [No. II. page 85.] to which I refer with regard to this article: So you ſee the whole expence of incloſing in the above manner is only one ſhilling per acre per annum yearly of intereſt; as for the principal, I think it can be no where better ſecured: So then, by the above calculation, there is four ſhillings yearly of real value added to each acre, meerly upon the account of being incloſed.

I ſhall conclude this letter with only obſerving, that ſince incloſing is ſo very advantageous to the country in general, by affording it more plentifully the neceſſaries, and even the comforts of life, and more profitable both to the proprietor

proprietor and tenant in particular, by adding ſo much to the intrinſic value of their land; it is therefore, indeed, ſurpriſing, that the proprietors ſhould not take every ſtep in their power to promote the undertaking, by giving their tenants long leaſes with this expreſs proviſion, that they incloſe their whole farms; and in caſe of failure, the leaſe to terminate at a ſhorter period. But where there are no clauſes about incloſing expreſly ſtipulated in the tack, I would recommend to have this general clauſe, except in ſuch farms where incloſing may be detrimental, which will be very ſeldom the caſe, that whatever improvements the tenant ſhall make by way of incloſing, that he ſhall be reimburſed his expences, or have the preſent value of his fences in the proprietor's option, paid him at the end of his leaſe, according to the determination of proper judges mutually choſen for that purpoſe. In that caſe, the tenant will have encouragement, if he incloſes all or any part of his farm, to do it in a durable and ſubſtantial manner, and not in ſuch a ſlight and temporary way, as they who have no ſuch clauſes commonly do. The proprietor, in ſo doing, will be a great gainer, having a clear view, in my opinion, of drawing in all time coming no leſs than twenty five per cent intereſt for his money. The above obſervations may be enlarged and improved upon by ſome of your correſpondents; but if not, I hope ſtill they may be of ſome uſe to the public; and if ſo, I have obtained the end for which they were intended.

I am,

SIR,

Yours, &c.

Feb. 9th, 1773. A. T.

ARTICLE XXXIV.

A ſucceſsful method of ſowing beans.

[In a Letter to the Publiſher.]

I No ſooner read the advertiſement of your preſent publication, and well knowing how much ſuch was needed, and of the immenſe benefit it might be to my country, than I determined to ſpread your Firſt Number with both hands, and endeavour to perſuade my brother farmers to encourage the work.

Agriculture is the nurſe of our ſpecies: Every attempt to render the knowledge of it more eaſy, is, in one ſenſe, *to cloath the naked and feed the hungry.* Many farmers there are in our own country, well ſkilled in their profeſſion, and who wiſh well to mankind; but, through modeſty, in this caſe blameable, keep their knowledge within their own neighbourhood. Let me intreat ſuch, to ſtand forth the true patriots of the kingdom; for he that can help his brother to increaſe his crop, is more worthy of publick eſteem than the titled ALEXANDERS or mighty CÆSARS.

Multitudes have more experience in country affairs than I have, and more leiſure to communicate that experience to the publick: But a deſire to be uſeful has induced me to ſend you the following obſervations.

The ſowing of peaſe is one of the greateſt drawbacks to the profit of the farms in this country. Clover and beans, on their proper ſoils, far exceed them: A proof of the ſuperior value of the latter crop, will appear from the following facts.

In the beginning of April laſt year, I ſowed ſeven Scots acres and a half with beans, and from what are now threſhed, the return is computed at one hundred and ten bolls. The method of culture was the following: The preceeding crop was barley after fallow and potatoes: The land for the beans had but one plowing, and the beans were drop-

ped

ped out of a man's hand into the bottom of every other furrow, ſo that one ſeeds-man kept two ploughs at work. The quantity of ſeed uſed was ſeven firlots per acre; the field was left without any harrowing, until the beans were juſt pointing through; the furrows of the ridges were then ſown, which could not be done before; and the land well harrowed and rolled, which deſtroyed the firſt crop of weeds. The roller ſmoothed the land for the ſucceeding hand-hoeing. When the beans were all up, the intervals were hand-hoed, and a fortnight or three weeks after, hoed a ſecond time. At harveſt the beans were allowed to ſtand until their leaves were withered; they were then cut, and bound with ropes of wheat-ſtraw, made by knotting the two ends together, in a way that I cannot deſcribe upon paper, but which is a far better method of binding them than that with oat-ſtraw ropes, as both taking a half leſs ſtraw, and two thirds leſs time in making them, and rendering it impoſſible for your ſervants to make the ſheaves too large: In a few days, if the weather is good, and the beans have been allowed to ſtand long enough, they will be ready for the corn-yard.

Many ſuppoſe beans will only grow upon ſtrong clays: In this they are much miſtaken; for any ſoil that is deep and rich will anſwer for them; Nay, I believe, that a deep rich earth is better for them than a clay. I would adviſe every farmer to ſow beans who has ſuch a ſoil: the only improper ones for beans are thin clays and thin gravels. The ſoil of my farm has very little clay in it, inſomuch, that when I firſt ſowed beans, a neighbouring farmer, whoſe judgement does honour to his profeſſion, told me my ſoil was too light. A good crop of beans never can be expected, unleſs the land is in heart, and the weeds cut up: after fallowed wheat or barley, they anſwer beſt. The expence of hoeing is but a trifle, in compariſon of the advantages ariſing from it; it does not exceed, for both times, ten ſhillings an acre. Here I might expatiate upon

the benefit of hoeing crops; but my intention at preſent is, ſimply to relate the method of procuring a good crop, and to reſerve that perhaps for the ſubject of another letter.

The proper time for ſowing beans is, the month of February, if the weather permits. The reaſon why I was ſo late as April, was, I could not do it ſooner for the froſt. Some may wonder at the quantity of ſeed ſown, when they are only dropt into every other furrow: All I ſhall ſay for that is, experience has ſhown, if you ſow leſs than ſeven firlots on an acre, you have a leſs return; and if you ſow more you are not the better for it. Others may wonder at the largeneſs of the produce, but I can aſſure them I have known ſeventeen bolls an acre raiſed on an average through a whole field.

Others may object the want of peaſe-ſtraw; but I can certify them, that my horſes never were fatter, nor more able for their work, than upon the bean-ſtraw; and the quantity raiſed is far greater.

I cannot conclude my little eſſay, without once more intreating the farmers in Eaſt-Lothian and the Merſe, to communicate their experience to their brethren. The Miſer that locks up his gold is, in the ſight of all, a guilty man; and ſurely, he is no leſs ſo, who has bags of uſeful knowledge (if I may be allowed the expreſſion,) and keeps them all to himſelf. How pleaſant will it be, to ſee our lands cloathed with double crops! The Landlord will get his rent: The tenant will have plenty for himſelf, and ſomewhat for the poor: And may it have the happy effect of raiſing gratitude in our ſouls, to the FATHER of MERCIES, *who giveth Seed time and Harveſt, the Early and the Latter Rain!*

Eaſt-Lothian,
Feb. 11. 1773.

RUSTICUS

ARTICLE XXXV.

On the Price of Corn, and Management of the Poor.

[*From* De Re Ruſtica; *or the Repoſitory*, VOL. I.]

THERE is now publiſhed in France a periodical work, called *Ephemerides du Citoyen*, in which ſeveral points intereſting to thoſe concerned in agriculture, are from time to time diſcuſſed by ſome able hands. In looking over one of the volumes of this work a few days ago, I found a little piece wrote by one of our countrymen, and which our vigilant neighbours had taken from the London Chronicle in 1766. The author is a gentleman well known to every man of letters in Europe, and perhaps there is none, in this age, to whom mankind in general are more indebted.

That this piece may not be loſt to our own country, I beg you will give it a place in your repoſitory: it was written in favour of the farmers, when they ſuffered much abuſe in our public news-papers, and were alſo plundered by the mob in many places *. The reaſoning of my good friend Arator, both in regard to the price of corn, and alſo our management of the poor, is extremely ſtriking: in regard to the poor, ſurely the legiſlature will, 'ere long, take it under conſideration; for at preſent they glory in their idleneſs and diſſolute morals, and boaſt that the pariſh is bound to maintain them: Add to this, the faſhion which has prevailed much within theſe laſt twenty years, of providing for young phyſicians and ſurgeons, by ſetting up hoſpitals for the poor under ſome pretence or other; which has really taken away, from the lower people, every incentive

* This piece, which was ſo well timed, when firſt publiſhed in England, becomes very ſeaſonable in Scotland at preſent; when the common people have taken it in their heads to riſe in mobs and riots, under the pretext of a ſcarcity of proviſions in market; and have proceeded with an uncontroulable authority to commit depradations, not of proviſions alone, but of every thing valuable they lighted upon.

tive to induſtry and frugality: nay, it has not only taken away the *ſtimulus*, but has in a manner deſtroyed the neceſſity of either.

Suffer me to add a word or two more in regard to the price of corn; for though at preſent we are pretty quiet on that ſubject, I think it will not be long before we have loud clamours from another quarter. Is it a clear point that the farmer can ſubſiſt when wheat is at 4*s.* or 4*s.* 6*d.* a buſhel? Every one knows how this was brought about; government was obliged to authenticate the decrees of the mob: however, the caſe is ſtill the ſame to the farmer, he is *under orders* as to the price of his goods. Will he long continue ſo? Can we promiſe ourſelves plenty by theſe means? Let us remember Colbert's policy, and compare it with Sully's maxims; let us reflect on our great national loſs for want of corn to export, and the large annual ſum we loſe thereby; let us therefore forthwith cultivate our preſent waſte lands, and no longer boaſt ſuch uſeleſs poſſeſſions, but regulate the price of corn by allowing a free importation and exportation; remembring, that a bounty will at all times greatly contribute to lead our ſurplus corn to foreign markets; neither can we ever be hurt by giving 4*s.* for forty: ſince it is not merely the price of the corn that is paid us, but alſo the freight, inſurance, commiſſion, &c.

To Meſſieurs the PUBLIC.

I am one of that claſs of people that feeds you all, and at preſent is abuſed by you all;—in ſhort, I am a *Farmer*.

By your news-papers we are told, that God had ſent a very ſhort harveſt to ſome other countries of Europe. I thought this might be in favour of Old England; and that now we ſhould get a good price for our grain, which would bring millions among us, and make us flow in money: that to be ſure is ſcarce enough.

But the wiſdom of government forbade the exportation. Well,

Well, ſays I, then we muſt be content with the market price at home.

No, ſays my Lords the Mob, you ſhan't have that. Bring your corn to market if you dare ;—we'll ſell it for you, for leſs money, or take it for nothing.

Being thus attacked by both ends *of the conſtitution*, the head and the tail *of government*, what am I to do ?

Muſt I keep my corn in the barn to feed and increaſe the breed of rats ?—Be it ſo ;—they cannot be leſs thankful than thoſe I have been uſed to feed.

Are we farmers the only people to be grudged the profits of honeſt labour ?—And why ?—One of the late ſcribblers againſt us gives a bill of fare of the proviſions at my daughter's wedding, and proclaims to all the world that we had the inſolence to eat beaf and pudding !—Has he not read that precept in the good book. *Thou ſhalt not muzzle the mouth of the ox that treadeth out the corn* ; or does he think us leſs worthy of good living than our oxen ?

O, but the manufacturers ! the manufacturers ! they are to be favoured, and they muſt have bread at a cheap rate !

Heark ye, Mr Oaf ;—The farmers live ſplendidly, you ſay. And pray, would you have them hoard the money they get ?—Their fine clothes and furniture, do they make them themſelves, or for one another, and ſo keep the money among them ? Or do they employ theſe your darling manufacturers, and ſo ſcatter it again all over the nation ?

My wool would produce me a better price if it were ſuffered to go to foreign markets. But that, Meſſieurs the Public, your laws will not permit. It muſt be kept all at home, that our *dear* manufacturers may have it the cheaper. And then, having yourſelves thus leſſened our encouragement for raiſing ſheep, you curſe us for the ſcarcity of mutton !

I have heard my grandfather ſay, that the farmers ſubmitted to the prohibition on the exportation of wool, being made

made to expect and believe, that when the manufacturer bought his wool cheaper, they ſhould have their cloth cheaper. But the deuce a bit. It has been growing dearer and dearer from that day to this. How ſo? Why, truly, the cloth is exported; and that keeps up the price.

Now if it be a good principle, that the exportation of a commodity is to be reſtrained, that ſo our own people at home may have it the cheaper; ſtick to that principle, and go thorough ſtitch with it. Prohibit the exportation of your cloth, your leather and ſhoes, your iron ware, and your manufactures of all ſorts, to make them all cheaper at home. And cheap enough they will be, I will warrant you—till people leave off making them.

Some folks ſeem to think they ought never to be eaſy, till England becomes another Lubberland, where it is fancied the ſtreets are paved with penny rolls, the houſes tiled with pancakes, and chickens, ready roaſted, cry, Come eat me.

I ſay, when you are ſure you have got a good principle, ſtick to it, and carry it thorough.—I hear it is ſaid, that though it was *neceſſary and right* for the miniſtry to adviſe a prohibition of the exportation of corn, yet it was contrary to law: and alſo, that though it was contrary to law for the mob to obſtruct waggons, yet it was neceſſary and right.—Juſt the ſame thing to a title. Now they tell me, an act of indemnity ought to paſs in favour of the miniſtry, to ſecure them from the conſequences of having acted illegally.—If ſo, paſs another in favour of the mob. Others ſay, ſome of the mob ought to hanged, by way of example.—If ſo,———but I ſay no more than I have ſaid before, *When you are ſure that you have got a good principle go thorough with it.*

You ſay, poor labourers cannot afford to buy bread at a high price, unleſs they had higher wages.—Poſſibly—But how ſhall we farmers be able to afford our labourers high

er wages, if you will not allow us to get, when we might have it, a higher price for our corn?

By all I can learn, we ſhould at leaſt have had a guinea a quarter more if the exportation had been allowed. And this money England would have got from foreigners.

But, it ſeems, we farmers muſt take ſo much leſs, that the poor may have it ſo much cheaper.

This operates then as a tax for the maintainance of the poor.—A very good thing, you will ſay. But I aſk, Why a partial tax? Why laid on us farmers only?—If it be a good thing, pray, Meſſieurs the Public, take your ſhare of it, by indemnifying us a little out of your public treaſury. In doing a good thing there is both honour and pleaſure;—you are welcome to your ſhare of both.

For my own part, I am not ſo well ſatisfied of the goodneſs of this thing. I am for doing good to the poor, but I differ in opinion about the means. I think the beſt way of doing good to the poor, is not making them eaſy in poverty, but leading or driving them out of it. In my youth I travelled much, and I obſerved in different countries, that the more public proviſions were made for the poor, the leſs they provided for themſelves, and of courſe became poorer. And, on the contray, the leſs was done for them, the more they did for themſelves, and became richer. There is no country in the world where ſo many proviſions are eſtabliſhed for them; ſo many hoſpitals, to receive them when they are ſick or lame, founded and maintained by voluntary charities; ſo many alms-houſes for the aged of both ſexes, together with a ſolemn general law made by the rich to ſubject their eſtates to a heavy tax for the ſupport of the poor *. Under all theſe obligations, are

* This applies particularly to the poors'-rates eſtabliſhed in England, which are generally complained of as a grievance, and a piece of bad policy. Attempts have been made to introduce them into Scotland: But it is hoped, that the example of our neighbours will ever deter us

are our poor modeſt, humble, and thankful; and do they uſe their beſt endeavours to maintain themſelves, and lighten our ſhoulders of this burthen? On the contrary, I affirm, that there is no country in the world in which the poor are more idle, diſſolute, drunken, and inſolent. The day you paſſed that act, you took away from before their eyes the greateſt of all inducements to induſtry, frugality, and ſobriety, by giving them a dependance on ſomewhat elſe than a careful accumulation during youth and health, for ſupport in age or ſickneſs. In ſhort, you offered a premium for the encouragement of idleneſs, and you ſhould not now wonder that it has had its effect in the increaſe of poverty. Repeal that law, and you will ſoon ſee a change in their manners. St Monday and St Tueſday will ſoon ceaſe to be holidays †. *SIX days ſhalt thou labour*, though one of the old commandments long treated as out of date, will again be looked upon as a reſpectable precept; induſtry will encreaſe, and with it plenty among the lower people; their circumſtances will mend, and more will be done for their happineſs by inuring them to provide for themſelves, than could be done by dividing all your eſtates among them.

from trying the experiment. They admire our policy in that reſpect, and envy us the happineſs of the exemption.

† The labourers and artiſans in England, never work on Monday and Tueſdays, till all their former weeks earnings are ſpent. In Scotland we do not want an inſtance of the like kind: Our coaliers follow the ſame rule, and of conſequence are equally mutinous and diſcontented. This proceeds from too high wages, which enable them in four days to gain a livelihood for the whole ſeven. This ſhould put us on our guard againſt the exceſſive riſe of labourers wages, which is faſt creeping in among us; and which in the end will undoubtedly produce the ſame effects, idleneſs, diſſipation, and extravagance, in the lower ranks of men.

THE SCOTS FARMER,

MARCH 1773.

ARTICLE XXXVI.

Of the old Scots Plough.

[Dickſon's Agriculture, Vol. I.]

THE plough is the principal inſtrument uſed in tillage. There are ſeveral kinds uſed in Scotland: The old Scots plough, the plough with the curved mold-board, the plough with the feathered ſock, the wheel-plough, the four-coultered plough, and the iron plough. All of theſe ploughs differ from each other. The difference betwixt ſome of them and others is very conſiderable; each of them has its admirers, and no doubt has its peculiar properties.

The old Scots plough is the moſt common and moſt generally underſtood; and therefore the other ploughs ſhould be compared with it, rather than with one another. When right made it is the beſt general plough; that is, the moſt proper plough for all purpoſes, when one only is uſed. Some of the other kinds of ploughs are, perhaps, more proper for ſome particular uſes; but none of them are ſo fit for all purpoſes. This may appear ſurpriſing to ſome perſons; and therefore, it is neceſſary to obſerve, that, by the plough, we mean the original ſtructure, form, or plan of the plough, and not this plan ill executed, as it is in many of the ploughs in the different parts of the country. Becauſe bad tradeſmen make this plough heavy and clumſy, ſome perſons ſeem to imagine, that this is intirely owing to the kind of plough: but this is unreaſonable; for it is certain, that this plough may be made as light and neat as any kind of plough whatever.

When we aſſert that the Scots plough is the moſt proper for all purpoſes, it muſt be remembered, that we have in view the lands of Scotland in their preſent ſituation. In lands that are improved, where the faſt ſtones have been carefully digged out, and the ſmaller ſtones frequently gathered off *, and the land kept free of the roots of quickening-graſs; the Scots plough may be made ſmaller and lighter, than in the following deſcription; ſome improvements may be made upon it, and even ſome other kinds uſed to greater advantage. But, while our lands are in their preſent ſituation, this plough will be found, upon trial, to be the moſt convenient.

The ſeveral parts of this plough are, the head, the beam, the ſheath, the wreſt, the mold-board, the two handles, and the two rungs; theſe are of timber: and there are of iron, the ſock and coulter. Theſe different parts are deſigned for the purpoſes following; the head and ſock for opening the land below; the coulter for cutting any thing that is hard on the ſurface, and for ſeparating from the firm land the earth that is ſtirred and turned over by the plough; the wreſt and mold-board for raiſing this earth, and turning it over; the beam for fixing the draught to, and keeping the ſeveral parts of the plough together; the two handles for directing and managing the plough; and the two rungs for fixing the two handles together.

Though the original form and ſtructure of this plough is good, and tho' a great deal depends upon the juſt proportions of its ſeveral parts; yet few perſons have examined it with that accuracy which it deſerves. Some, taking it for granted that the original form of it is bad, have endeavoured to introduce ploughs of a different form in its place; and without knowing whether or not the ſeveral parts of it are in their

* In a ſcheme of management, which requires the frequent laying of land into graſs, for hay; the ſmaller ſtones will be all gathered off in a ſhort time.

their juſt proportions and poſitions, have been prevailed upon to atteſt, That upon trial, a plough of another form is found to be more eaſily drawn, and to make better work. A comparative trial is, no doubt, the proper way to judge which of two ploughs is the beſt: But, by this trial, we cannot determine which of two kinds is the beſt, unleſs we know that both the ploughs tried are equally good of their kind. This is mentioned to prevent perſons from being impoſed upon by pretended trials, and to engage them to make themſelves maſters of the ſtructures of the different ploughs, before they determine which is the beſt.

But tho' it ſhould be allowed, that, in ſome reſpects, the Scots plough is inferior to ſome others lately introduced; yet ſtill it may be uſeful, particularly to thoſe who are attached to it, to give a particular deſcription of it, and to ſhow how to make it, in the manner moſt proper to anſwer the purpoſes deſigned.

That this deſcription of the Scots plough may be the better underſtood, we ſhall conſider the ſeveral parts of it ſeparately, and ſhow how they are joined together; and, to aſſiſt us, ſhall make uſe of a few figures.

The part of the plough that falls naturally to be conſidered, in the firſt place, is the head *; ſee fig. 1. The length of the head, from A to B, is about twenty inches; and the breadth, from A to D, about five inches. C is the point upon which the ſock is driven; and the length from B to C, is about ſix inches. *a* is the mortoiſe, into which the larger handle is fixed; and *b* is the mortoiſe, into which the ſheath is fixed.

The head is the part of the plough that goes in the ground. The ſhorter therefore that it is, the friction is the leſs, and the

* This part of the plough, which, in Scotland, is called the *head*, is commonly, in England, made of iron; is of one piece with the ſock, and is called the *plough-ſhare*.

the plough the eaſier drawn; and the longer that it is, the plough is the more ſteady in going, and not ſo eaſily put out of its direction, when it meets with obſtructions. Twenty inches may be conſidered as a mean length, and will anſwer tolerably well in every ſort of land. In land where there are few obſtructions, it may be a little ſhorter; but in land where there are many obſtructions, it ſhould be a little longer. The narrrower that it is, provided it is ſtrong enough, the better; for the friction is the leſs, and the breadth ſerves no purpoſe, but to make it ſtrong. The two mortoiſes in it will not allow it, at leaſt where they are, to be much leſs than five inches, even in land where the plough meets with feweſt interruptions in going. The length from B to C is for fixing the ſock, and whatever ſerves this purpoſe is ſufficient.

The ſheath falls naturally to be conſidered in the next place. It is repreſented, in fig. 2. by E B. It is driven into the mortoiſe, *b*; and thus fixed to the head A B. It is not perpendicular to the head, A B; but placed obliquely ſo as to make the angle, contained by the lines E B and A B, about 60 degrees. It is about thirteen inches long, beſides what is driven into the mortoiſe, *b*; about three inches broad, and one thick †.

Now it is to be obſerved, that to the ſheath is fixed the mold-board, as in fig. 10 in the ſame manner as the wreſt is fixed to the head in fig. 7. The deſign of the mold-board is to turn over the earth of the furrow, which the plough makes: And it is obvious, that, according to the poſition of the ſheath, the earth of the furrow is turned over more ſuddenly, or is raiſed and turned over more gradually. If the ſheath is ſet near the perpendicular, the earth of the furrow

† This part of the Scots plough, which we call the *ſheath*, has the ſame name given it by ſome of the Engliſh writers. But in the new modelled Hertfordſhire wheel-plough, that which anſwers to the ſheath is called the *fore-ſheet*.

row, in riſing up from the fore part of the wreſt, is ſoon reſiſted by the mold-board, and turned over ſuddenly. For, if the ſheath, inſtead of being placed in the poſition E B, is placed nearer the perpendicular, in the poſition *e* B, the mold-board, as it makes an angle with the plane of the head and ſheath, of about 30 degrees, as ſhall be ſhewn afterwards, will be raiſed above that plane, at the point *f*, and will give reſiſtance to the earth of the furrow, at a place of the plough, where no reſiſtance is given, if the ſheath is in the poſition E B; and therefore will turn it over more ſuddenly. On the other hand, if the ſheath, inſtead of being placed in the poſition E B, is placed more ſloping in the poſition *g* B, then the earth of the furrow is higher raiſed up, before it meets with the ſame reſiſtance, as when the ſheath is in the poſition E B, and is turned over more gradually.

It may be obſerved likewiſe, that, according to the poſition of the ſheath, the upper part of it, where it is fixed to the beam, is nearer, or at a greater diſtance from the coulter: See fig. 6. And according to this diſtance, the plough is in greater or leſs danger of being choked (as the plowmen term it), when going in land that is full of the roots of quickening-graſs, or has upon it a rank ſtubble. Any perſon that will carefully obſerve a plough going in land in either of theſe ſituations, will ſoon find, that the ſtubble, or the roots, which the plough puſhes before it, are ſometimes intangled betwixt the coulter and ſheath, and thereby the plough interrupted. The nearer that the ſheath and coulter are to each other, where they are fixed to the beam, this happens the oftner; and, the farther they are from each other, this happens the ſeldomer.

If the ſheath ſlopes in ſuch a manner, as to make an angle with the head of about 60 degrees, the earth of the furrow will be ſufficiently raiſed up, before it is turned over; and the ſheath and coulter will be at a ſufficient diſtance, from each other, where fixed to the beam.

The

The length of the ſheath depends upon the poſition of the beam. As the beam is high or low ſet, the ſheath muſt be longer or ſhorter. It is commonly about a foot from the upper ſide of the head to the under ſide of the beam. It is needleſs to give directions about the breadth and thickneſs, for they ſerve no purpoſe but to render it ſtrong.

The larger handle falls to be next conſidered. It is repreſented in fig. 3. by F A. It is fixed to the head, by driving it into the mortoiſe, *a*. It is placed in the ſame plane with the head. It is in length, from A to F, about five feet four inches; and in diameter, at A, and upwards to the place where it is fixed to the beam, about two and an half inches; but it becomes leſs and leſs, as it approaches to F. The handle is not ſtreight; about ten inches from A, there is a curve, which, when F is raiſed to its proper height, makes the lower part of it nearly parallel to the ſheath E B. And the moſt proper height is about three feet two inches from the end of the handle, which the plowman holds by, to the bottom of the furrow which the plough makes when going.

According to the length of the handles, the perſon that holds the plough manages it the eaſier. The reaſon is obvious; the longer that the handles are, the ends of them, which the plowman holds by, are the farther removed from the centre of gravity; and therefore the plough itſelf is turned by them with leſs ſtrength. If the larger handle is about five and an half feet, the plough may be eaſily managed upon any kind of land. The handles of the Hertfordſhire wheel-plough are ſhorter; but then it is to be obſerved, that the wheels regulate the plough, and leave the perſon that holds it very little to do.

The higher that the ends of the handles are raiſed, provided that they are no higher than the lower part of a man's breaſt, the perſon that holds can the more eaſily raiſe the plough out of the ground; for the plough is raiſed out of the ground by preſſing upon the handles, which raiſes the fore part of the plough; and a perſon can preſs with greater force when ſtanding

ſtanding upright, than he can do when obliged to ſtoop. On the contrary, the lower that the handles are ſet, the plowman can the more eaſily force the plough into the ground; for the plough is forced into the ground by raiſing the handles, which ſinks the fore part of the plough; and a perſon can raiſe a weight much more eaſily, when he is obliged to ſtoop to it, than when it is raiſed above his hand. When the handles are ſet about three feet high, a perſon of an ordinary ſize may manage the plough; and, with no great difficulty, can either raiſe the plough out of the ground, or force it into it.

The deſign of the curve in the handle is to ſtrengthen the plough; for the nearer that the lower part of it, by the curve, approaches to the parallel of the ſheath, the beam is the ſhorter, and the plough more compact and firm.

We proceed next to the deſcription of the beam. It is repreſented on fig. 4. fixed to the larger handle and the ſheath; all of which, with the head, are in the ſame plane †. The length of it, from H to I, is about ſix feet. It is about four inches

† Some perſons are at a loſs to comprehend how this plough ſhould go right, when no land is given by the beam. To account for this, let it be obſerved, that land is given to a plough either by the manner in which it is conſtructed, or by the manner in which the cattle are yoked to it. When the beam is placed to the right of the plane of the head then land is given by the conſtruction of the plough; and when the cattle are yoked in ſuch a manner as to make the beam, when the plough is going, move along the unplowed land, then land is given by the manner of yoking the cattle. The ordinary way of yoking cattle, is in pairs, one of each pair go in the laſt made furrow, the others upon the unplowed land; the beam lies in a direction betwixt them, and the diſtance of the land-ſide of it from the furrow, may be from five to nine inches, which, if the beam is in the ſame plane with the head and ſock, is the breadth of the earth of the furrow taken off by the plough; or the quantity of land given to the plough by the manner of yoking the cattle.

inches diameter; and it is curved in such a manner, as to make the perpendicular *c d* about five inches.

The plane of the beam must be so far raised above the plane of the head, that, when the plough is going at its proper depth, the beam may not be incommoded by any thing on the surface. But it ought to be no higher raised than is necessary; for the nearer it is to the head, the sheath is the shorter, and the plough more compact and firm. It should be fixed in the handle at H, so as that from H, to the bottom of the furrow made by the plough in going, the distance may be ten inches.

The position of the beam depends upon the number of cattle in the plough, and the manner in which they are yoked; and it is set high or low according to the direction of the draught.

When there are two horses in the plough yoked abreast, then a perpendicular I N let fall from that part of the end of the beam, to which the draught is fixed, to the plane of the head should be about twenty-one inches; so that if a rule is laid along the head, and extended forward, and the beam placed in such a manner, as to make the nearest distance from the bolt-hole at the end of the beam to the rule, about twenty one inches, it is right placed for two horses only in the plough yoked a-breast.

When there are four horses in the plough yoked two a-breast the height of the end of the beam should be about eighteen inches; so that if the beam is placed in such a manner, that the nearest distance from the bolt-hole to the rule, in the position formerly mentioned is about eighteen inches, it is right placed, for four horses in the plough yoked two a-breast.

Though a plough is right constructed, yet in some lands it will go too deep, and in others not deep enough; this is owing to the oblique position of the coulter meeting with resistance on different places. If the land is soft and free above and hard below, as is the case when one is inclined to plough

a field a little deeper than uſual, the reſiſtance which the point of the coulter receives, gives the plough a tendency to come out of the ground; and when the land is firmer above than below, as is the caſe when there is a tough ſward of graſs upon ſoft land, then the reſiſtance which the coulter meets with above, more than below, makes the plough go in too deep. It is very difficult to make a plough go in land of this kind at an equal depth, without having a wheel at the end of the beam.

The beam is made ſix feet long; and it is obvious that it cannot be much ſhorter. For in a four horſe plough, the height of the beam being eighteen inches from the bolt-hole to which the draught is fixed to the bottom of the furrow made by the plough in going; if the plough makes a furrow ten inches deep, as is ſometimes done, then there are only eight inches from the bolt-hole to the ſurface; and if the beam is but four inches diameter at the bolt-hole, which is the leaſt that can be ſuppoſed, if there are two bolt-holes, there are only ſix inches from the under ſide of the beam to the ſurface, which is as little as can be allowed, to prevent the beam from meeting with interruptions in moving forward; eſpecially if a bridle is uſed for altering the eard of the plough. But if the beam is made leſs than ſix feet, then to bring the bolt-hole down to the line of direction of the draught, it muſt be ſet lower; and if this is done, the beam has not freedom to move if the furrow is ten inches deep.

The beam, however, may be made ſhorter in a two horſe plough, or an ox plough; for as the draught in theſe ploughs is in a line of direction that is higher than that of the others, the bolt-hole being twenty one inches from the plane of the head, the bolt-hole may be ſet farther back, and the beam thereby ſhortened ſix or ſeven inches; and yet be ſtill as far from the bottom of the furrow, as in a four horſe plough. The length of the beam, however, depends upon the depth of the furrow intended. If the furrow, at any time, is to be more than ten

inches deep, the beam muſt be more than ſix feet long; but if it is never to be ſo much as ten inches deep, the beam may be leſs than ſix feet, if the ſurface is ſmooth.

The beam is curved ſo, as to be about five inches beyond a ſtreight line drawn from the middle of the two ends, viz. at *c d*; and a little beyond the deepeſt part of the curve at *e* is the place of the beam through which the coulter paſſes; and it ſlopes in the poſition *e f*. When there is any ſtubble or a ſward of graſs on the ſurface, or any roots on the land, they are raiſed up by the plough in going; and if immediately before the coulter the beam is placed near the ſurface, the things raiſed up by the plough are entangled betwixt the coulter and beam, and thereby the plough is much incommoded. The more that the beam is curved, the plough is the leſs incommoded, for the things raiſed up by the coulter, not being ſo ſoon reſiſted by the beam, are turned to a ſide along with the earth of the furrow, inſtead of being entangled betwixt the beam and the coulter. But on the other hand, the more the beam is curved it is the more eaſily broke, and the ſheath and coulter being longer, are thereby rendered weaker, and the more eaſily broken likeways. When the beam is curved in the manner propoſed, that is five inches, the impediments that the plough meets with in going may eaſily be removed; or, according to the language of the plowman, the beam is well redd, and at the ſame time ſufficiently ſtrong.

According as the beam is curved, the end of it to be fixed in the larger handle muſt be ſet higher or lower. If it is much curved, it may be ſet the lower, becauſe the curve raiſes from the ſurface that part of the beam by which the plough is incommoded; but if it is little curved, it muſt be ſet the higher, that ſo before the coulter it may be raiſed to a proper diſtance from the ſurface. When it is curved about five inches, it may be fixed at H, ſo as that from H to the bottom of the furrow may be ten inches.

From conſidering the height of the beam, it will appear how the plough may be made to go deeper or ſhallower, by

by the different ways of yoking the cattle. By placing the cattle at a greater diſtance from the plough, or putting the traces lower upon their ſhoulders, the plough is made to go deeper; and by bringing the cattle nearer the plough, or raiſing the traces, or ſhortening the back ropes, the plough is made to go ſhallower.

Fig. 5. Repreſents the ſock fixed to the end of the head; It is about two feet long. As the head is twenty inches, the parts of the Scots plough that anſwer to the Engliſh ploughſhare, are in length about three feet eight inches.

In fitting the ſock to the head, it is found neceſſary to turn the point of it a little towards the land, or to the left ſide. The reaſon is this: The ſock, in going forward, meets with greater reſiſtance from the land-ſeed which is firm, than it does from the furrow-ſide, which eaſily yields to it. This gives the plough a tendency to come out of the land; and therefore, to prevent this, it is neceſſary to turn the point of the ſock a little towards the land. By turning the point of the ſock, an alteration is made in the going of the plough. When turned to the left ſide, as has been obſerved, the plough takes off more land; when turned to the right, it takes off leſs land; when turned upwards, the plough goes ſhallower; and when turned downwards, it goes deeper: For to the ſide to which the point of the ſock is turned, the plough naturally tends from the reſiſtance it meets from the oppoſite ſide.

But it is obvious, that the turning the point of the ſock, not only makes an alteration in the going of the plough, but alſo makes it not ſo eaſily drawn. For let us ſuppoſe, that the ſock, inſtead of being in the direction B P, is in the direction B O; ſee fig. 5. the beam and the head being in the ſame direction, the plough muſt move forward in the direction A B; and it is obvious, as this is the caſe, that it meets with greater reſiſtance when the ſock is in the direction BO, than when in the direction B P. When the ſock is in the direction B P, the point opens the furrow to its full depth, and no reſiſtance is given but to the upper ſide, by the raiſing

of

of the earth; but when it is in the direction B O, reſiſtance is not only given to the upper ſide, by its raiſing the earth, but a much greater reſiſtance is given to the under ſide, by its opening the furrow. For as B is much lower than O, the furrow is not opened to its full depth by the point of the ſock, but is made deeper and deeper by the under ſide of it, as it moves forward; which is a great interruption to the plough, and makes it much heavier to draw.

It may be obſerved likewiſe, that the going of the plough depends, in ſome meaſure, upon the length of the ſock. The longer that the ſock is, the plough goes the deeper; and the ſhorter that it is, the plough goes the ſhallower.

FIG. 6. Repreſents the coulter fixed to the beam. It is about two feet ten inches long, two and an half inches broad, ſharp at the point, ſharp alſo before, and thick on the back like a knife. To determine the place of the coulter, raiſe a perpendicular at B, upon the head A B; and where that perpendicular cuts the beam, is the place through which the coulter paſſes. It is fixed and directed by wedges, ſo as to place the point of it equal to, or rather a little before the point of the ſock; and upon a line with the left ſide of the head. This oblique poſition of the coulter makes it have the greater influence. For when it meets with roots, or any other things that interrupt its going, it throws them out of the land, which requires leſs ſtrength than cutting or puſhing them forward; which it muſt do, if ſet near the perpendicular. Beſides, in this oblique poſition, it more eaſily cuts any thing that is hard, as it moves forward, than when placed more upright. Its other poſition, with the point in a line with the left ſide of the head, makes it open the furrow in ſuch a manner, as to prevent the reſiſtance to the head from being ſo great as it would be, if the point of the coulter was placed more to the right. For, if the point of the coulter is placed to the right of this line, the left ſide of the ſock rubs upon the firm land; but, if the point of the coulter is placed exactly in this line, then this ſide of the ſock meets with no reſiſtance, but from the

the earth that falls betwixt the ſock and the coulter. On the other hand, if it is placed to the left of this line, it will force a great load of earth upon the ſock, meet with more reſiſtance itſelf, and be in greater danger of being broken, or put out of its direction. From this we may obſerve, that the going of the plough depends, in ſome meaſure, upon the poſition of the coulter. If the coulter is placed upon a line with the left ſide of the head, then the plough meets with little reſiſtance on that ſide, and goes ſtraight forward: But, if the coulter is placed to the right of this line, then the plough meets with reſiſtance on that ſide, and is forced out of the land. And, if it is placed to the left of this line, the reſiſtance which it meets with on the right ſide forces the plough a little towards the land. The placing the coulter in this way, with the point of it much towards the land, has another effect; it makes the plough go more ſteadily. The greater that the diſtance is betwixt the point of the coulter and the point of the ſock, the earth that the coulter goes in is the firmer; and thereby it becomes the more difficult for any interruption which the ſock meets with, to put the plough out of its direction. A lazy plowman, ſenſible of this, for his own eaſe, will make this diſtance much greater than it ought to be, if care is not taken to prevent him. But the going of the plough depends not only upon the poſition of the point of the coulter, but alſo upon the poſition of the plane of it. If the coulter is placed in ſuch a manner, that the plane of it cuts the plane of the head behind, or has the fore part of it turned a little to the left; then the reſiſtance which the coulter meets with, makes the plough tend to the left. On the other hand, if the coulter is placed in ſuch a manner, that the plane of it cuts the plane of the head before, then the reſiſtance which the coulter meets with, makes the plough tend to the right.

FIG. 7. Repreſents the wreſt fixed to the head. B K is the wreſt: It is about twenty-ſix inches long, two inches broad,

and

and one thick. The wreſt, B K, is fixed to the head A B, at B in ſuch a manner, as to make the angle contained by the lines A B and B K, about 25 degrees. The wreſt is ſeldom, or rather never, placed in the ſame plane with the head: But raiſed gradually from the place where it is fixed to it; that is, from B to K, as in fig. 8. The poſition of the wreſt determines the kind of furrow that the plough makes. In proportion to the greatneſs of the angle A B K, in fig. 7. and to the ſmallneſs of the angle A B K, in fig. 8. the furrow that the plow makes in going is wide below. And, in proportion to the ſmallneſs of the angle A B K, in fig. 7. and the greatneſs of the angle A B K, in fig. 8. the furrow that the plow makes is narrow below; that is, as the wreſt is wide and low ſet, the furrow is wide; and as the wreſt is narrow and high ſet, the furrow is narrow.

FIG. 9. Repreſents the two handles fixed together by the two rungs. The larger one has already been deſcribed; the leſſer one is a few inches ſhorter, and need not be made quite ſo ſtrong. The diſtance of the two handles, at the little rung depends upon the poſition of the wreſt. Their diſtance, at the ends F and N, is about two feet ſix inches. Now, it is to be obſerved, when the larger handle, A F, is fixed into the mortoiſe, *a*, of the head A B, and the leſſer handle, L N, to the wreſt K B, at L; ſee fig. 7.; that the handles not only riſe gradually from A and L, till at F and N, they are about three feet two inches high; but alſo gradually increaſe in diſtance, till, at the ſame places, their diſtance is about two feet ſix-inches.

FIG. 10. Repreſents the leſſer handle fixed to the wreſt and mold-board, and the mold-board fixed to the ſheath. E B the ſheath, B K the wreſt, L M N the leſſer handle, and B M K the mold-board. Now, as the ſheath, the head, the beam, and the larger handle, are all in the ſame plane; and as the handles gradually recede from each other, as they proceed upwards, it follows, that the upper part of the mold-board at M, is at a greater diſtance from the plane of the head and

larger handle, than the lower part of it, at K; or, which is the ſame thing, that the angle, which the upper ſide of the mold-board, M E, makes with the beam, is greater than the angle, which the wreſt, B K, makes with the head: And hence the mold-board is not ſtreight; but is gradually projected outward, as it is raiſed upon the handle, from L to M. It is this caſting out of the mold-board that turns the furrow: and it may be caſt outward in ſuch a manner, as either to ſet the furrow upon its ſide, or turn it quite over on its back, as is found convenient.

If the wreſt is high ſet, the earth of the furrow will not touch the hinder part of the mold-board, but is raiſed and turned by the wreſt. In this caſe, the furrow which the plough makes, is no wider below, than the breadth of the head; the earth of the furrow is raiſed and turned over by the wreſt, as the plough moves foreward; and the furrow is no wider above, than the part of the wreſt that turns the earth of it, is diſtant from the plane of the head. Thus, ſuppoſe that B K, ſee fig. 7. is ſet ſo high, that N is ſix inches above the under part of the head; if the plough goes ſix inches deep, then the furrow that the plough makes, will be below, equal in wideneſs to B C, and, above, to N D. If the plough goes deeper, the furrow will be wider above than N D; if ſhallower, it will be narrower than N D.

The mold board in the common ploughs is, generally ſpeaking, almoſt quite ſtreight. In order to fit it to the plough, it is made of a thick piece of timber, and the lower part of it, at B, ſee fig. 10. where it is applied to the ſheath, and the upper part, at M, where it is fixed to the handle, are hollowed on the inner ſide. When the mold-board is thus hollowed on the inner ſide, if, by taking off from it, on the outer-ſide, it is made equally thin in all places, then it is of the proper ſhape, as already deſcribed.

Fig. 11. Repreſents the plough complete by joining together figures 6. and 10. in the ſheath E B, the wreſt B K is

ſuppoſed

ſuppoſed to make an angle with the head A B, as in fig. 7. and the handles joined together, as in fig. 9.

If the conſtruction of the plough is attended to, it will appear, in what manner in going it ſeparates, raiſes, and turns over the earth of the furrow. If it had no coulter, the earth would open above the middle of the ſock, and in a line before the ſheath; but as the coulter opens the earth on a line with the left ſide of the head, if the ſoil has any coheſion, the earth of the furrow will be wholly raiſed from the left ſide, and as the ſock moves forward, will be thrown on the right ſide of the ſheath; and by the caſting out of the mold-board, or the raiſing of the wreſt, will be turned over. If the earth of the furrow, taken off by the coulter, is juſt equal in breadth to the under ſide of the head, and that part of the wreſt that is in a line with it, or as low ſet, then this earth is juſt wholly moved and turned; if it is leſs, then it is not only raiſed and turned, but alſo ſhifted a little to the right hand; if it is greater, the whole of it is not moved, but the under part of the right ſide remains firm.

We formerly obſerved, that the Scots plough is the best general plough, and on that account preferred it to any other at preſent uſed in Scotland. We did not intend however to aſſert, that it is perfect. Whoever attends to the ſtructure of it, the manner in which it ſeparates, raiſes, and turns over the earth of the furrow, will obſerve ſome defects. As the ſock is high in the middle, and round on the ſides, as the point of it is in a line with the middle of the head, it is obvious, that a great force is neceſſary to raiſe the earth of the furrow; and as the ſheath is nearly in a line with the point of the ſock, and to the right of the left ſide of the head, the earth of the furrow, as it is raiſed, muſt ſtrike againſt the ſheath; and if it does not ſtick cloſe together, a part of it will fall to the left ſide, inſtead of being turned wholly to the right. Theſe are defects, for they make the plough heavy to draw; and beſides, this poſition of the ſheath makes the Scots plough

ugh improper for hoeing, as the earth that falls to the left, ies the young plants in the rows.

To remedy the defect arising from the ſock, it is propoſed make a ſock ſtreight on the land ſide, ſo as to be in a line h the land or left ſide of the head, and ſtreight alſo below, s to be in a line with the under ſide of the head, ſloping on furrow or left ſide, and alſo on the upper ſide from the nt, ſo as to make it at the root about ſeven inches broad, three inches thick; at the ſame time ſloping all the way m the land to the furrow ſide, ſo as to form the furrow-ſide a ſharp edge. It is obvious, that this ſock in going meet with leſs reſiſtance than the common ſock, will e the earth of the furrow wholly from the left ſide, and n it as it is raiſed.

To remedy the defect ariſing from the ſheath, it is propoſ- to bring the ſheath a little nearer the larger handle, and to another ſheath a little before it, to the left or land-ſide of head and beam, and fix the mold-board to this ſheath. It is ious, if this is done, that the earth of the furrow, as it is ed by the ſock, will be reſiſted by the mold-board only, wholly turned to the right.

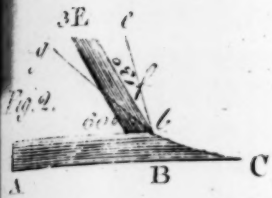
y this alteration of the ſock which is propoſed, the point of s brought exactly to the place of the point of the coulter he common plough: This makes it neceſſary to change poſition of the coulter, and to place the point of it in a with the point of the ſock a little above, or a little before it, both, as found moſt convenient.

There is another thing ſuppoſed alſo to belong to the plough, that is the bridle or muzzle. It is fixed to the end of beam, and the cattle are yoked by it. The one common- uſed is a curved piece of iron fixed to the beam by a bolt ugh it. See fig. 12. A B C is the curved piece of iron, C the bolt by which it is fixed to the beam, D is the ingle-tree or croſs-tree, to which the traces are fixed, and s a hook, or the cleek, as it is commonly called, which s the muzzle and ſwingle-tree.

There is another kind which is uſed by ſome. It is fix
to the beam by two bolts. It has notches by which the cle
of the ſwingle-tree may be fixed, either to the right or the le
of the beam, and there are different holes for the hind bo
to paſs through, by which the draught may be fixed eith
above or below the end of the beam. See fig. 13. ABC
anſwers to A B C in fig. 12. A D is the fore bolt, up
which the muzzle turns; on B C are four notches, betwi
any two of which the cleek of the ſwingle-tree may be fixe
When the cleek is fixed at B, the plough is turned towar
the firm land, and takes off a broader furrow; or, as th
plowman call it, the plough has more land. When the cle
is fixed at C, the plough is turned towards the furrow or th
plowed land, and takes off a narrower furrow; or, as th
plowmen call it, has leſs land. E and F are the holes on ea
ſide, through which the hindmoſt bolt paſſes. When this bo
is put through the higheſt two, theſe holes being there
brought to the middle of the beam, the fore part of the mu
zle is raiſed above the beam, and the plough is made to g
deeper; or, as the plowmen call it, the plough has more ear
And when the bolt is put through the loweſt two, the fo
part of the muzzle is thereby ſunk below the beam, and th
plough is made to go ſhallower; or, as the plowmen c
it, has leſs eard. And thus, by changing the place of th
cleek of the ſwingle tree, or changing the poſition of th
muzzle, the plough is made to take off a broader or a narrow
er furrow, or to go deeper or ſhallower, and a ſmall erro
in the original make of the plough rectified.

Some are of opinion, that this muzzle is not proper whe
the plough is going upon land where there are many faſt ſtones
for when the plough ſtrikes againſt a ſtone, this muzzle bein
fixed by two bolts, and not having that freedom to move, o
that play, as it is commonly called, which the common muz
zle hath, the plough is in greater danger of being broke
But this ought not to be an objection againſt the uſing o
thi


Fig.1.
a
b
C
2C
B


E
C
d
Fig.2.
b
A
B
C


F
Fig.3.
3 2
5 4
E
a
b
G
A
B
C


F
N

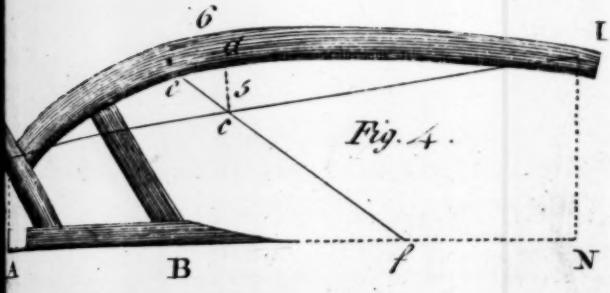
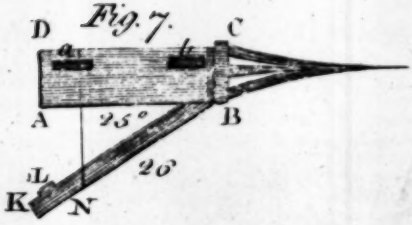

6
a
I
c
5
c
Fig.4.
A
B
f
N

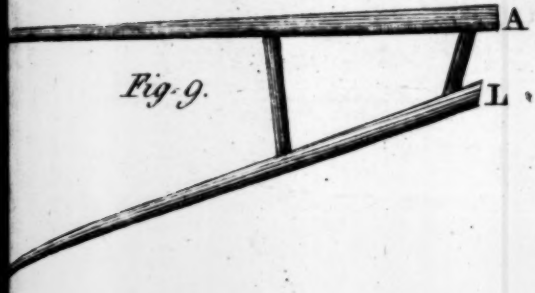

Fig.5.
O
P
A
B
Q


D
Fig.7.
C
a
b
A
25°
B
L
20
K
N


C
A


Fig.6.
2.10
2 5
B


K
Fig.8.
A
B


A
Fig.9.
L

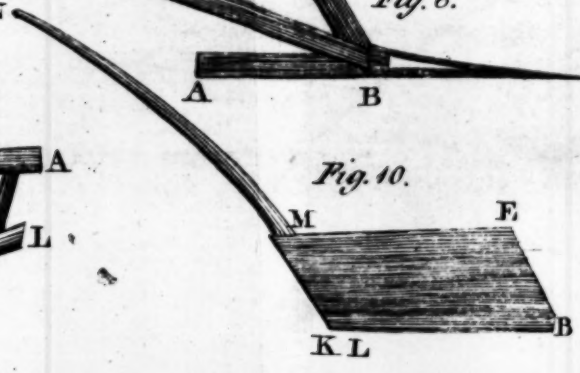

N
Fig.10.
M
E
B
K L



Fig. 11.

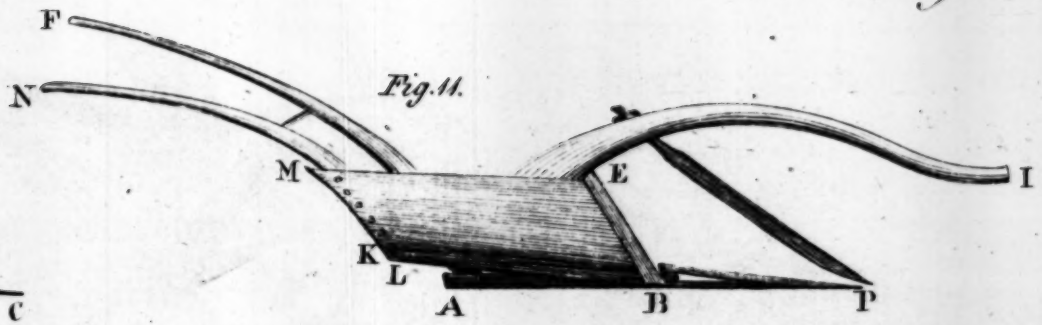


Fig. 12.

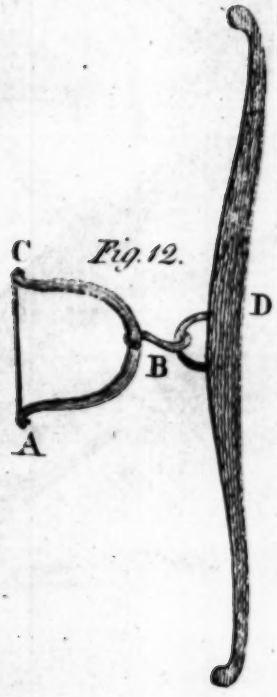


Fig. 14.

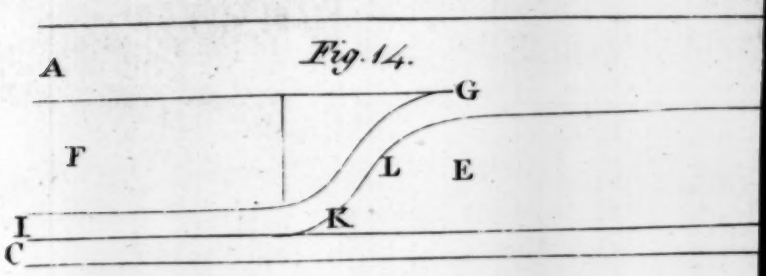


Fig. 13.



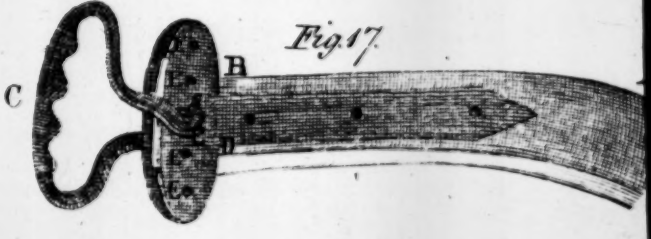
Fig. 15



Fig. 16.



Fig. 17.



this muzzle: For whenever the plough is going upon land where an accident of this kind is apprehended, this muzzle may be made to have the ſame play with the other, by taking out the hindmoſt bolt. In ſome places where the common muzzle is uſed, there are two bolt holes made in the end of the beam, the one above the other, by means of which the plough may have more or leſs eard. This points out a kind of muzzle that has all the advantages of the one laſt deſcribed, and at the ſame time has the ſame play with the common muzzle. It is repreſented on fig. 17. A is the end of the beam, B a plate of iron ſunk into it by its whole thickneſs, and, with one of the ſame kind in the other ſide, riveted faſt into it by bolts. C is the muzzle fixed to theſe plates of iron, by the bolt D, which bolt may be made to paſs thro' any of the holes E. It is plain from the conſtruction of this muzzle, that it has the ſame play with the common muzzle, and that by it both the eard and land of the plough may be altered.

ARTI.

ARTICLE XXXVII.

On the Culture of Potatoes.

[From *De Re Ruſtica;* or, The REPOSITORY; in a letter to the Editors.*]

GENTLEMEN,

ACcording to my promiſe, a few days ago, I have ſent you the incloſed obſervations on the culture of the potatoe, which were publiſhed about a year ſince in the Mancheſter paper, for the benefit of my neighbours, and I now offer them to you for the uſe of the public in general. They come from one who is a well wiſher to all publications that give any uſeful information or knowledge in a ſcience of the utmoſt importance, not only to the well-being, but to the very being of every ſtate: from one alſo, who has the honour of being preſident of a provincial ſociety for promoting rural improvements, by premiums and proper directions to the induſtrious and unexperienced farmers; the benefit of which eſtabliſhment, tho' not quite of two years ſtanding, has been already proved and acknowledged by the neighbourhood, the particulars of which you may poſſibly hereafter receive, if you ſhould think they would be of public uſe. I am, &c.

Fulborne, near Cambridge,
March 31, 1769. R. T.

* We are much obliged to this gentleman for the following piece; and as we are fully convinced that nothing can tend more effectually to promote the great cauſe of agriculture, than communications from the ſeveral county ſocieties relative to the meaſures they have purſued, and the ſucceſs that has attended them; ſo we ſhall at all times be ready to lay them before the public by means of our Repoſitory. Repoſ.

To the Editors of the Work, *De Re Ruſtica*.

GENTLEMEN,

I have taken the liberty of offering my ſentiments on the nature and cultivation of that moſt uſeful and excellent root, the potatoe, through the ready and extenſive conveyance of your work. Though this plant (which was firſt brought from America to Ireland by the great Sir Walter Raleigh) is a ſpecies of the ſolanum, or night-ſhade; yet long experience has fully convinced us, that it is one of the beſt and moſt nutricious of all the eſculent roots that are raiſed for food. The very great uſe and advantage of this valuable vegetable, was never more fully experienced than two years ago; when an extraordinary crop †, both in quantity and quality, of that year's growth, undoubtedly reduced the high prices of grain ſo much in this populous neighbourhood, as to give the poor an opportunity of buying that grand neceſſary of life, upon more reaſonable terms, than it was to be had in many of the moſt conſiderable corn counties in England. It may therefore be of ſervice to point out the beſt methods that have occured to me (either from the authority of reputable and experienced writers upon the ſubject, or from my own experience), not only of obtaining a very large crop, but, at the ſame time, of preparing the ground in the beſt manner, for a ſucceeding one of wheat; an object of great importance to farmers.

I will mention, in the firſt place, the kind of ſoil, that, in my opinion, is the moſt proper for the advantageous culture of this excellent root. The potatoe plant will indeed grow in

† From an acre and a half (ſtatute meaſure) I had as many potatoes as ſold, at the low price of 1 s. 3d. per buſhel, for 34 l. beſides ſerving my own family, which is a pretty large one, and ſaving a ſufficient quantity of ſets for planting near two acres of ground the year following.

in almoſt any ſoil, but the mere growth of the plant, or the poor return of a few ſmall inſipid roots, are not worthy the care and attention of any farmer. Nothing is more material or neceſſary to thoſe, who wiſh to farm to *uſeful purpoſes*, than a thorough and accurate knowledge of the nature and qualities of the ſeveral kinds of ſoil contained within their farms; and the ſkill of adapting their crops accordingly. For want of *ſuch knowledge* and *ſkill*, I have known a novice in the buſineſs (even in incloſed grounds) ſow his wheat upon a light ſandy ſoil, and his barley upon a good clay-land; and upon a diſappointment at harveſt in his crops, the natural conſequence of his folly, complain of ungenial ſeaſons, and the unkindneſs of providence. But if a labourious man will do his part with care and proper attention, Heaven will be propitious. The foſtering breezes blow—the ſoftening dews and tender ſhowers deſcend—and the world-reviving Sun will temper all into the perfect year.

The ſoil which I would prefer above all others for the potatoe plant, is juſt the ſame kind which Columella recommends for vines. *Nec ſpiſſum ſit nimis, nec reſolutum, propius tamen reſoluto: nec exile nec lætiſſimum, tamen læto proximum: nec campeſtre nec præceps, ſed potius edito campo: nec ſiccum nec nimis uliginoſum.* That is, "The ſoil ſhould "neither be too ſtiff and untractable, nor too light and crum- "bling, yet rather of a crumbling nature: neither too poor "nor too rich, yet inclining to richneſs: neither too flat nor "too hilly, but rather gently riſing: neither quite dry, nor "yet ſurcharged with moiſture." With *ſuch* a *ſoil* and *proper* management, a noble rerurn may be expected indeed; and the nearer any ſoil approaches to the nature and qualities above recommended, the more proper will it be for the cultivation of the potatoe plant.

As the different ways of preparing the ground, *either by plowing or trenching*, for the above purpoſe, are ſo well known in all parts of *the country*, I will only give it as my opinion, that trenching with the ſpade, though the moſt expenſive, is far

ſar preferable to all the reſt, and will, generally, more than repay the additional expence. I will alſo venture to condemn the common Iriſh-way of planting, which is known and uſed in ſome parts of England, under the proper denomination of the *lazy-bed way*. It is only laying the eyes or ſets upon the ſurface of the ground, with a little dung over them, and then making a trench or deep furrow on each ſide, and covering the ſets with what comes out of the trenches: By which horrid practice, a barren and noxious under-ſtratum of earth or rubble is often thrown up ſo high, as never to get buried again, but remains there as a woeful exchange, for ſome of the fineſt mould, that is buried beneath the reach of the plough.

I will now endeavour to point out the beſt method of planting the ſets, both for the preſent crop, and alſo for a due preparation of the ground, for a ſucceeding one of wheat. The ſets, with two or three eyes in each, ſhould be planted in † rows, two feet aſunder at leaſt, and at the diſtance of fifteen inches from each other in the rows; and then the ground ſhould be well broke in with a rake or light harrow. After the plants are come up, the firſt growth of the weeds ſhould be carefully obſerved, and taking advantage of a dry and hot ſeaſon, the hotter the better, be cut down with a ſharp hoe, both betwixt and in the rows, and the earth hoed up a little towards the roots of the plants. The weeds being checked in their firſt ſhoot, and in ſuch weather, will be long before they make any conſiderable head again. About Midſummer it will be neceſſary to go over the ground once more with the hoe; and if the advantage before recommended of a dry and hot ſeaſon can be taken for that purpoſe, it will generally be ſufficient

† The rows ſhould run from north to ſouth, or with a little turn to the eaſt if the ground will conveniently admit of it, in order to give the greateſt admiſſion of the ſun's heat and influence to the intervals, and alſo to the roots of the plants.

ficent to keep the ground clean and free from weeds the reſt of the ſummer; as the plants by that time will be grown ſo ſtrong and buſhy, as nearly to cover the whole ſurface of the ground, and thereby prevent, by their ſhade and dropping, any future growth of weeds. Theſe ſtirrings of the ground by the hoe, will keep it in a proper tilth, and kindly diſpoſe it to receive the benign influence of the ſun, air and dews; and ſuch intervals or ſpaces betwixt the rows of plants, will give due admiſſion to the air, ſo abſolutely neceſſary for vegetation. For the air, as biſhop Berkeley obſerves in his *Siris*, "is "the receptacle as well as ſource of all ſublunary forms, the "great maſs or chaos, which imparts and receives them. "The atmoſphere which ſurrounds our earth, contains a "mixture of all the active volatile parts of all vegetables, mi- "nerals, foſſils, and animals. Whatever perſpires, corrupts or "exhales, impregnates the air, which being acted upon by the "ſolar fire (here is literally *conjugis in græmium latæ deſcen-* "*dit*) produceth within itſelf all ſorts of chemical operations, "diſpenſing again thoſe ſalts and ſpirits in new generations "which it had received from putrefactions. The air there- "fore is an active maſs, compoſed of numberleſs different "principles, the general ſource of corruption and genera- "tion, in which the ſeeds of things ſeem to lie latent, rea- "dy to appear and produce *their kind*, whenever they light "upon a proper matrix. The whole atmoſphere ſeems alive; "there is every where *acid* to corrode, and *ſeed* to engender, "in this common ſeminary and receptacle of all vivifying "principles." That the free circulation and admiſſion of air are not only conducive, but alſo abſolutely neceſſary to a ſpeedy and vigorous growth of plants, might be proved by many experiments, if neceſſary; but it is too obvious to every one, who has taken the leaſt notice of the operations of nature in the work of vegetation, to need ſuch proofs of its utility. Without ſome air, vegetation would abſolutely ſtop; for a proof of which, I ſhall inſert an experiment made by

the late ingenious Mr Ray, which is inserted in the Philoſophical Tranſactions, of "ſome lettuce-ſeed which was ſown "in the glaſs receiver of the air-pump, exhauſted from all "air, which ſeed did not grow the leaſt in eight days time; "whereas ſome of the ſame ſeed, ſown at the ſame time in "the open air, was riſen to the height of an inch and an "half; but the air being admitted into the receiver of the "air pump, the ſame ſeed, which had not diſcovered the "leaſt ſign of vegetation in ſo many days before, within the "ſpace of one week grew nearly to the height of three in-"ches."

Many people, from want of experience, are apt to imagine, that the greater number of plants they can get, the larger will be the yield of the crop. In regard to numbers, poſſibly it may be ſo, though that admits of very great doubt with me; but the true proof of the yield or return is, in the weight and goodneſs of the crop, and not merely in the number of poor pitiful roots. In the promiſcuous way of planting, and ſo cloſe too, the ſtems of the plants are drawn up ſo high and ſmall by their contiguity to each other, that they appear weak and ſickly long before the proper time of perfecting their roots, and thereby indicate a miſerable crop of half-ſtarved potatoes, hardly worth the trouble of getting up and carrying home. The ground, as is obſerved by Mr Tull, (to whom not only his own country, but all Europe, is ſo much obliged, for laying the foundation of all the modern improvements in huſbandry) contains a certain quantity of pabulum or food for plants, which, though it may be conſiderably increaſed and improved by manures and artificial tillage, has its limited bounds, its *ne plus ultra*, and therefore from which no more can be had. The ſame gentleman, whoſe veracity and accuracy are indubitable, mentions an experiment that he made, which fully proves the great advantage of planting the potatoe-ſets at a conſiderable diſtance from each other, and alſo the great utility of hoeing and ſtirring the ground well

about them. " A piece of ground, ſays he, was planted
" with potatoes, the greater part in the common way; but
" in a part (worſe than the reſt) they had been ſet *a yard diſ-*
" *tance every way*; the reſt of the ground was dunged: this
" poor part had no dung, but was plowed four times in diſ-
" ferent ways; ſo that the ground was broken and ſtirred
" thoroughly every way about the potatoes. The conſequence
" was, that though no dung was uſed here, and the plants
" appeared ſhorter than the dunged part, yet the crop was
" greatly better than in the other part of the field. The roots
" here were all large; in the other part of the field where
" the dung had been uſed without *ſuch plowing*, they were
" ſo ſmall, that the crop was ſcarce worth taking up. This,
" ſays he, is one of the many inſtances of the no great uſe
" of dunging land without properly ſtirring it up; and ſerves
" to prove, what the crops of corn and every thing elſe con-
" firm upon trial, that the ſtirring the earth, without any
" farther trouble, will anſwer better without any *other* ma-
" nure, than all the manures in the world *without it*." Where
great quantities are planted, and there is alſo a ſcarcity of la-
bourers, the hoeing with a ſmall light plough will be neceſ-
ſary for diſpatch, and will do very well, though it is not equal
to hand-hoeing, as the weeds cannot be ſo effectually cleared
away by that method, betwixt the plants in the rows; and
there is alſo another inconveniency attending it, that of the
roots being ſometimes buried too deep, by the large covering
of earth thrown upon them by the plough; and which, if
too great, will be almoſt fatal to the plants in every reſpect,
but eſpecially in the goodneſs of the roots. For it is found
from conſtant experience, that whenever the potatoe-ſets are
planted too deep, (eſpecially if the ſoil be moiſt or heavy)
they are watery and inſipid, or have an earthy ſickly taſte,
not affording that mealy quality, which is the perfection of
this excellent root, both in point of flavour and nutricious-
neſs. The plants, when they are in a healthy vigorous
ſtate

ſtate, will, by the umbrageous defence of their thick leaves and ſtems, ſufficiently protect the roots from the too ſcorching rays of the ſun, and thereby procure a due degree of moiſture in the ground; yet without excluding ſo much of his energetic power, as is neceſſary for perfecting the grand work of vegetation: but if the roots are buried too deep, that cheering and vivifying power of the ſun is ſo weakened and impeded, in exerting its neceſſary influence, that they never arrive at their utmoſt ſtate of perfection.

If the potatoe-crop is intended to be dreſſed and weeded by the hoe-plough, two rows ſhould be planted pretty near together, about the diſtance of a foot from each other; but the intervals betwixt thoſe double rows ſhould be four feet wide, or there will not be room enough for the plough to work without injuring the ſtems of the plants: this is a very expeditious way of cleaning a crop; and, where the ſoil is not too prone to produce graſs and weeds, will anſwer all the purpoſes of hoeing very well, if the hand-hoe is afterwards made uſe of for clearing away the weeds that grow in the rows.

Having now given directions about the management of the crop, from the time of planting the ſets till the time of the plants arriving at their full maturity; I will beg leave to offer my ſentiments, with great deference to the public, in regard to the beſt kinds of potatoes now cultivated, both for ſummer and winter uſe. For the former, I would recommend the early-white dwarf, and the flat-white kidney, by ſome called the Spaniſh potatoe: for the latter, the white ruſſet, the red ruſſet, the Iriſh dun, and the ſmooth winter-white potatoe. Indeed, for black earth ground, the Iriſh black potatoe, and the old Engliſh red, are the moſt proper, as they are very hardy, and will bear moiſture better than any other kind. The pine-apple potatoe is a prodigious bearer; but I cannot recommend it for its flavour. There are ſeveral other kinds beſides theſe already mentioned, very little inferior

rior in goodneſs to them, and which are only accidental variations from them; and many more might be obtained, by planting the potatoe-apples which contain the ſeed, inſtead of the ſets: whether any better or not, is impoſſible now to determine; but to the curious ſuch trials would be entertaining, and poſſibly very uſeful to the public, as a new ſpecies might be obtained thereby, ſuperior in every reſpect to any we yet know of. I will conclude this very long letter with obſerving, that a little quick-lime, ſpread thinly over the ground after the ſets are planted and harrowed in, will help greatly to meliorate the ſoil, and prevent the ſpeedy growth of weeds. I am, &c.

CHREMES.

Near *Rochdale*, *Lancaſhire*,
March 19. 1769.

*** The beſt method of cultivating potatoes, ſo far as relates to field culture, we apprehend to be, by throwing the ground into three feet lands, and planting a ſingle row upon the crown of each land at twelve inches apart; cultivating the intermediate ſpace with a ſmall plough: by this method we have ſeen a large crop of very fine potatoes procured from light land, by no means rich, and without the aid of dung.

ARTICLE XXXVIII.

Methods propoſed for Landlords encouraging their Tenants—Public Meetings of Farmers conducive to Improvement—Of the Stocking and Oeconomy of Farms.

[In a letter to the Publiſhers.]

HAVING all my lifetime been a Farmer, as my forefathers for many generations paſt have been, I am glad to ſee every where a ſpirit for improving therein prevail; and having read your firſt three Numbers of the SCOTS FARMER, an

am hopeful your book may prove of great uſe for promoting the improvements in this country, as it will be a mean of communicating the minds of Gentlemen and Farmers from one part of the country to another, and informing the public of their improvements, with the expence, and returns, and ſoils on which they are made: As theſe will be much more certain, and ſuitable to our climate than books from England or Ireland, no Gentleman or Farmer of any ſpirit but, on that account, ſhould give all the aſſiſtance in his power, to have his knowledge and experience in Farming made known for the public good.

There are other two ways of communication, that, in my opinion, might be of great uſe; the firſt is, one or more yearly meetings between Gentlemen and their Tenants; and the other is, a meeting of Farmers, at which Gentlemen, if they pleaſe, may be preſent.

The advantages to be reaped from the firſt of theſe are manyfold. When a gentleman reſides upon his eſtate and manages it himſelf, then he muſt neceſſarily be well aquainted with all his tenants, and be well informed of the characters and circumſtances of each of them. He will have a pleaſure in riding through his eſtate, and obſerving the conduct of his tenants; and will thereby be led to give his countenance and encouragement to one, while he withdraws it and expreſſes his diſpleaſure to another, according to their reſpective merits. When a gentleman on the other hand does not reſide upon his eſtate, he is often an utter ſtranger to all his tenants, who know him when he comes to his country-ſeat only by his livery ſervants, his fine horſes, or his carriage. All that he knows about any of his tenants is from the information of his factor; and that is often the offspring of miſtake, or the reſult of malice or reſentment, becauſe the tenant has not made him the proper acknowledgements or compliments which his avarice expected: From ſuch motives the tenant is repreſented as an ignorant ſlothful turbulent fellow, or as a bankrupt; and

the

the factor eaſily obtains authority to oppreſs him by law-ſuits or otherwiſe, in order to remove ſuch a nuiſance from the eſtate, and procure a tenant in his room, more agreable to his wiſhes, and more conducive to his intereſt; while the landlord ſuffers egregiouſly in the opinion of his tenants and of the whole country. If at any time, the poor oppreſſed tenant ventures into the preſence of his maſter, the natural timidity and awkwardneſs of the man, encreaſed by the preſence of the great man, who he knows is prepoſſeſſed againſt him, confirms him in the bad impreſſions he has already received from the factor; and that confidence and mutual truſt which ought to ſubſiſt betwixt them is broke: and the tenant loſes that ſpirit which is neceſſary to ſet his induſtry in motion, and conſiders his maſter no longer as his patron and protector, but as his powerfull enemy and oppreſſor.

How is this evil to be remedied? The annual meeting now propoſed will contribute greatly to that end; and it will be of great ſervice even to the reſiding landlord. But previous to that, the landlord ſhould take a ride over his whole eſtate, and notice particularly the order and condition of the ſeveral farms, ſo as to be able to talk to his tenants about them. The factor having appointed his general day of clearance, the landlord ſhould be preſent and ſee the finiſhing hand put to it. In this caſe the tenants would exert every endeavour to come prepared to clear their laſt moieties or ballances of rent, and receive their annual diſcharge in his preſence. The natural pride which is in every man's breaſt, to be up-ſide with his neighbours and equals, would be a ſufficient ſpur to his activity; and the fear of incurring the cenſure of his landlord, or being debarred from the entertainment, which ſhould be prepared for them on the occaſion, would actuate his induſtry, and fix his attention to this great object through the whole preceeding year. From the previous knowledge he had acquired by his ride through his eſtate, the landlord would be enabled to talk to them of their crops, their fences, their houſes, and

other matters, with accuracy and diſtinctneſs; and might depend upon the information he would thereby receive, much more certainly than from any that can be given him by his pen and ink factor, who, for the moſt part, being ignorant of juſt farming, knows no other method of improving an eſtate, than by racking the rents and ſqueezing the tenants.

If he had obſerved one man's crop of corn ſomewhat worſe than his neighbours, the tenant would frankly own, that he could blame neither the ſoil nor the ſeaſon; he would explain the reaſons; one field required to be drained, another needed a recruit of lime or dung; a third demanded a fallow or a fallow crop: But, alas! the tack is within three years of expiring; the factor, without conſidering the expence to be incurred, inſiſts upon very high terms, for a new leaſe; and without that certainty, the tenant would be mad to lay out that expence. The gentleman, poſſeſſed of more enlarged and generous views than his little narrow-minded factor, would ſecond his tenant's wiſhes, and order an improving tack to be made out for him.

Another he would blame for the bad order of a young hedge and ditch lately made upon his farm, which he was obliged to uphold and preſerve by railing, &c. The tenant acknowledges the fact; but ſays, that hedge has coſt more expence than all the others put together: For that ſmall pendicle in the neighbourhood, which was lately ſet by the factor for a tippling houſe on account of twenty ſhillings more rent, is become the common haunt of tinkers, chapmen, and ſturdy ſtrolling beggars, who traverſe the fences, and breaks them down to feed their horſes in the incloſures in the night time; and it is ſhrewdly ſuſpected, that one of theſe was the thief who ſtole neighbour George's horſe, and that the ſheep are now and then miſs ſerve to make up their entertainment. The whole tenants will join in the general wiſh, that their landlord will repreſent theſe things to the other gentlemen of the county, and prevail on them to adopt the plan of police already received in ſome ſhires, and ſee to its vigorous execution.

Two

Two fields of very thriving cabbages and turnips, and an adjoining field of extraordinary barley and graſs-ſeeds having attracted the attention of the landlord, he commends them hugely, and deſires the tenant to tell his method of management. Dung, ſays the tenant, is the mother of cabbages and turnips, as well as of corn; the foddering yard, which his Honour recommended laſt year, and helped to build, and uſing the cabbages and turnips in the houſe, and littering well, has done the whole. A large ſtack of over-year's ſtraw and the ſecond crop of hay were uſed in the yard for the lean winterings. The ſtables and byres were regularly cleaned, and the dung mixed up in layers with fat earth in the yard; by which means the quantity of dung was ſurpriſingly encreaſed; and beſides the benefit from the dung, the number of men and horſes can now be reduced; and thoſe that are kept are conſtantly employed.

From ſuch converſations the landlord will ſoon acquire a thorough knowledge of all his tenants: he will be able to diſtinguiſh the good from the bad; the induſtrious, active and vigilant, from the ſloven, the ſpendthrift, and the vitious: his countenance and approbation will be reckoned a great reward; and they will ſoon perceive, that this is not to be acquired by making intereſt with a factor, a lady's waiting woman, or a valet-de-chambre, whoſe informations for the moſt part proceed from unjuſtifiable motives, and, though inviſible, are often moſt powerful ſprings in the adminiſtration of eſtates. The landlord thus ſees every thing with his own eyes, or receives his information from the beſt ſource: for in theſe converſations, a good tenant will be aſhamed to give falſe information; and the bad one, whoſe manners are diſcrepant from his neighbours, will not dare in their preſence to palliate his ſloth or graceleſſneſs by falſe excuſes, in which he would be immediately detected: ſuch a man would ſoon be marked: and if a new tenant was offered, the other tenants, whoſe intereſt is deeply concerned to procure a good neighbour, would

prove

rove the landlord's beſt privy councellors as to the character
d circumſtances of the candidate.

At this meeting too, the tenants would have an opportunity
expreſs their general grievances, and to engage their beſt
iend and patron to redreſs them if in his own power, or to
pply for redreſs elſewhere. Some of theſe ſhall be hinted.
he aſtriction to milns is generally complained of as a grie-
nce: If the miln belongs to the landlord, the remedy is
ain; and I am convinced, there are few tenants but would a-
ree to an additional rent for a freedom of aſtriction. And if the
iln belongs to another heritor, this additional rent would en-
le the landlord to purchaſe an immunity for his whole lands †.

Another is, the unequal impoſition of the ſtatute work for
e highways. Tenants are not ſo blind to their intereſt as
ot to perceive and feel the advantages of good roads; But
hen their landlord is at a diſtance or inattentive, they are
ten hauled ſeveral miles from home with their horſes and
arriages, while the roads of their own pariſhes remain im-
aſſable. This annual viſit propoſed would awaken the
ndlord's attention to the intereſt of his own lands; and the
ommiſſioners of ſupply would not thwart his inclination
expreſſed to them.

A third and very general grievance is, the diſconformity
f weights and meaſures, under which the whole nation ſuf-
rs. It is not every county only, but every pariſh, nay al-
moſt every barony and eſtate, has its own firlot. This occa-
ons great uncertainty in bargains, much wrangling and debate
n deliveries of victual, and very often lawſuits, which of all
hings ought to be avoided by tenants. I am told, that by the
w of Scotland before the Union, the boll of Linlithgow mea-
ure was the ſtandard for the whole kingdom: But that by the
rticles of Union, the Wincheſter buſhel was appointed to be
he ſtandard of the whole United Kingdom. To whoſe pro-

† We refer our readers to the next Article, which is on this
ubject.

vince it belongs to enforce either the one or the other, I cannot say: But let me tell the nobility and gentry, that it is a shame to them to let this matter lie neglected, which is so material to the internal police of the country. If there is no jurisdiction to enfore it, why not procure a new law for that purpose, when they are every day getting new laws passed for things of much smaller moment.

By thus condescending to notice their different concerns and to attend to their various requests, the landlord will appear to make their interests his own; a mutual confidence will be created; and in place of looking on him with the eye of slavish subjection and fear, which low minds feel in the presence of their superiors, and in which the greatest part of the tenants in Scotland are held at this day, from a very mistaken notion, that the poorer and meaner the tenandry are they will be the more easily governed; they will consider him with reverential love and regard, and esteem him as their best friend and benefactor, their patron, their guardian, and their guide.

Gentlemen, I hope, will pardon my presumption, if, from my zeal for promoting the improvements of Agriculture, I propose, that they should appropriate a small sum for premiums to be determined at this annual meeting, in favours of such of the tenants as shall distinguish themselves by the greatest spirit, ingenuity, and industry in particular branches of farming. These may be given, either in money to enable and encourage the tenant to attempt some new experiment, I mean, what may be new to him; as in sowing grass-seeds, turnips, cabbages or other crops of the drilled kind; or they may be given in farming instruments, made by approved tradesmen; which would at the same time serve to introduce the use of better instruments than are commonly used through the country, which in many places are of a very bad construction; and many of the most useful, such as the roller, the large harrow, the fanners, &c. are hardly known. This naturally suggests another

this

ing that would be of great importance; the procuring good lough wrights; which two or three neighbouring gentlemen, pon an aſſurance of encouragement, could eaſily procure.

Would gentlemen turn their attention to theſe things, and many others that will occur to themſelves, tending to the ame end, a very great improvement would ſoon appear upon heir eſtates at a very triſling expence to themſelves; and they ould have the heart-felt ſatisfaction, of promoting the happi- eſs of their tenants and the good of the publick, along with heir own intereſt. And I cannot help thinking, that a gen- eman of fortune, preſiding at the head of a board, and all is tenants around him, with hearts full of admiration at his ondeſcenſion, and of gratitude for his goodneſs, muſt appear o the thinking part of mankind, in a more ſplendid and rilliant character, than if he was to preſide at an aſſembly r a ball of the firſt gentry, or to hold the firſt place at a King's Court.

The ſecond meeting I propoſed was, a club or ſociety of Farmers, which ſhould be eſtabliſhed in different corners, for nformation in matters of farming. The ſtarting different ueſtions, which ſhould be diſcuſſed in the club, would ſerve reatly to improve the members in their notions and prac- ices. If the queſtion was of moment, it ſhould be minuted y the clerk, along with the anſwers given to it.

The neighbouring clubs ſhould correſpond together for mutual information; and if any thing remarkable is carrying n, or any advice demanded, ſome of the members ſhould be ppointed as viſitors for that end; and a general club or ſociety f Gentlemen and Farmers ſhould be eſtabliſhed at Edinburgh, with whom all the country clubs ſhould correſpond, to whom hey ſhould make annual reports of the improvements or ex- eriments made in the different diſtricts, and from whom hey might receive advice and directions from time to time. Theſe reports ſhould be very particular, and ſhould contain deſcription of the ſoil and climate on which the experiments, ere made; what was the complexion of the weather during

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the different operations of plowing, ſowing, harrowing, hoeing, &c. with an exact account of the expence, the returns and profit. If theſe reports, or ſuch of them as ſhould be judged proper for the publick uſe, were publiſhed, from time to time, in your uſeful and patriotick publication, an univerſal ſpirit of improvement would thereby be ſoon ſpread over the whole country; and the meaneſt member would pride himſelf in having contributed his mite to the general good.

I cannot upon this occaſion reſtrain myſelf from thanking you, Sir, or thoſe publick ſpirited gentlemen, who planned the deſign of your preſent work; a work calculated for the good of thoſe who ſtand moſt in need of aſſiſtance, the ignorant and uninſtructed Farmer. The papers already publiſhed on many important and intereſting ſubjects, give hopes, that it will excite a general ſpirit of communication over the country; and that, having ſo ready and proper a channel to communicate their thoughts and experiences, you will never want a variety of uſeful materials; and that you will have ample encouragement to perſiſt in the publication, which I dare ſay is generally read, and, if I can judge, muſt be generally approved.

Having, I fear, taken up too much of your time, I ſhall now come to the thing which I firſt intended; to wit, To give you my thoughts in anſwer to your Leading Queſtions concerning Farms, [No I. p. 34] To this no direct anſwer can be given, ſo far as I know: For the rents, extent, and manner of ſtocking, differ very much in different countries. In my humble opinion, where the ground is all arable, the moſt advantageous extent of Farms ſhould be about one hundred and twenty Scots acres. Theſe ſhould be incloſed and ſubdivided into twelve incloſures, and kept in the following courſes: viz. Four incloſures under corns, four under paſture, two under hay, two under cabbages, turnips, potatoes, or ſome ſuch fallow crop, as the ſoil and knowledge of the Farmer ſhall judge beſt: In this method the farm could be managed by four men and ſix horſes, and theſe could be kept cloſe employed.

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The ſtock requiſite to pleniſh this farm, ſuppoſing the entry to be at Martinmas, will be as follows;

	L.	s.	d
Forty bolls of corn with ſtraw for ſeed at 15 *s.* *per* boll	30	00	00
Sixty bolls of oats with ditto for his horſes, at 15 *s.*	45	00	00
Four horſes and two mares, at 14 *l.* ſterling each	84	00	00
Ten milk cows at 5 *l.* ſterling each	50	00	00
Thirty cattle for his graſs at May, as this year he has no fodder for the foddering yard, at 2 *l.* 16 *s.* each.	84	00	00
Thirty cattle to lay on his hay foggage, then to fatten on his fallow crop of two parks, at 3 *l.* 10 *s.* each	105	00	00
Wages to the four men ſervants at 6 *l.* ſterling each, and to the two women ſervants at 2 *l.* ſterling each	28	00	00
For cutting, winning, and ſtacking 20 acres of hay, beſides his own ſervants	4	00	00
Harveſt wages for ſhearing forty acres of corn, as his own ſervants are for the moſt part otherwiſe employed	12	00	00
To ſix hundred ſtones hay at 4 *d.* each ſtone, as the ſtraw will not ſerve both horſes and cows	10	00	00
To three double carts with traces, &c. for ſix horſes	16	00	00
To two ploughs for ſeed furrows	2	00	00
To one ditto for hoeing, and two for fallow	2	10	00
To three pairs of harrows five feet long, three feet broad, with ſix iron teeth in each tire, and each two coupled together	2	00	00
To two ſmall ditto for graſs-ſeeds, and one large ditto for fallow	1	10	00
To a wheel-barrow, three grapes, four ſpades, four hay forks, two corn ditto, and twenty four ſacks for grain	2	12	6
For lime and other manure, having no foddering yard this year	20	00	00
To houſhold furniture	60	00	00
To maintain the Farmer, his wife and two children, four men and two women ſervants	50	00	00
	L. 608	12	6

As the ground is ſuppoſed good, I allow the crop to be as follows:

	L.
His 46 acres of corn ſhould produce 9 bolls each acre, making 360 bolls. But as 100 bolls are to be kept for ſeed and horſes, there remain only 260 bolls to be ſold, and theſe reckoned without fodder, as that goes to the foddering yard, the grain muſt be reckoned at 14 *s.* each boll	182
The firſt crop of hay of 20 acres, at 150 ſtone per acre, and ſold at four pence per ſtone	50
Twenty acres turnip or cabbage to fatten 30 cattle, and theſe to bring of profit 2 *l.* 10 *s.* ſterling each	75
Ten calves ſold off his ten cows, at 10 *s.* ſterling each	5
Butter and cheeſe ſold from ten cows	25
The profit of 30 cattle fattened in ſummer	75
	412

CONTRA.

	l.	*s.*	
Off this comes his rent of 120 acres at 22 *s.* per acre	132	00	
The family's maintenance computed at	50	00	
The ſervant's wages, hay and harveſt included,	44	00	
Hay for his horſes laſt year	10	00	
To one year's intereſt of the three laſt ſums	5	4	
To one year's intereſt of 504 *l.* 12 *s.* 6 *d.* at 7 *per cent.* on account of waſte lying and continuing on the farm	35	6	
	276	10	
The Farmer's profits	135	10	412

ART

Two things, in my opinion, ought to be chiefly conſidered by Farmers. *Firſt*, A method whereby feweſt men and horſes would be neceſſary for their farm; and theſe conſtantly employed to advantage on the farm. 2*dly*, To purchaſe cattle at the cheapeſt ſeaſon, and to ſell them at the deareſt. The propoſed plan, in my opinion, would anſwer both purpoſes; and at the ſame time another very eſſential one, of making the farmer maſter of much dung from the foddering yard. Since the year 1766, cattle have been bought, when lean in the ſpring, at two ſhillings *per* ſtone, and ſold when fat at the end of the graſſing ſeaſon at two ſhillings and ſix-pence the ſtone, I mean Dutch weight. In the method propoſed, the Farmer may have fifteen hundred ſtone of hay off his twenty acres in his ſecond crop, as his ground is in good heart; and that mixed up with his ſtraw, will fodder thirty cattle in the yard, which I allow with his ten milk cows to eat his forty acres that are in paſture: the thirty lean cattle he can buy in the end of the year at two ſhillings the ſtone, if well wintered, he can lay them on his graſs, and by having four parks can ſhift them from one to another; by which means he can by the end of June ſell ten out of them at four ſhillings the ſtone; the graſs will then be good for the reſt through the whole ſeaſon, ſo as he can keep them till December, and then ſell them at an advanced price, and make much more than he did laſt year, as they will greatly encreaſe in weight, and come to a better market. This method ſaves a number of both men and horſes; for four men and ſix horſes could not do it in any other order or courſe, but in this they can; for the ſix horſes make two ploughs, three in each, yoked end-long going before one another, or trip-plough as ſome call it, being the beſt way; they plow in winter for the next year's ſummer crop, and for the barley; and in ſpring, for beans, oats, and barley for ſeed furrows for turnips, ſowing, and horſe-hoeing them, and cabbage, &c. driving coals for the family, repairing roads, driving hay and grain, &c. In harveſt putting in corns, and ſowing

ing wheat. Thus they are conſtantly employed, and the men and horſes both work for their meat.

If you think this deſerves a place in your next Number of the Scots Farmer, give it, and next opportunity I ſhall give you my opinion of ſome of your other queſtions. Correctneſs of ſtile does not belong to my profeſſion; I have hitherto been, and reſolve to be, what I am now going to ſubſcribe,

February, 26. Your moſt humble ſervant,

1773. A FARMER.

ARTICLE XXXIX.

Of Aſtriction to Mills as an obſtacle to Improvement, and a Propoſal for aboliſhing it.

[In a letter to the Publiſher.]

I Am one of your readers; and from the ſample you have already given, I am very ſanguine in my expectations, that your undertaking will greatly contribute to the improvement of our Scots Agriculture, and conſequently to the intereſt of the country. That is ſo deſirable an end, that every man who wiſhes well to his country, (and who is it that would not be affronted if he was told he did not) ſhould put to a helping hand to promote it. And yet ſtrange and incredible as it is, thoſe very perſons who were to reap the immediate advantage of a more improved agriculture and a better cultivation, the landlords themſelves, by their oppreſſion, ſlavery, and bondage in which they keep their tenandry, have been the principal cauſe of retarding that progreſs which it might otherways have made. Under the pretext of ſervices, or harriage and carriage, as it was termed in their tacks, the landlord could appropriate the whole labour of his tenants, their ſervants, and horſes, without any remuneration. His own farm, or Mains, as it was called,

as plowed, harrowed, and reaped by them: His peats or fir-
g was caſt, win, and led home by them, and the tenant him-
lf could, at a moment's warning, be ordered of an errand,
veral days from home, upon his own charge, let his own
rivate buſineſs, or the buſineſs of his farm, be never ſo
reſſing. This oppreſſion affected the greateſt part of the
orth, and every part of Scotland in ſome degree; and
as a branch of the policy of that ancient Gothick ariſtocracy
nder which the nation ſo long groaned. Could any good
ing be expected from ſuch men! who, as they could hardly
e ſaid to have a free action, it was not to be expected they
uld foſter a liberal thought.

Soon after the Union of the two kingdoms, when the im-
rovement of the country came to be an object of ſpeculation
ther than of practice, this grievance was perceived as an invin-
ible obſtacle in the way; and the Parliament of Great Britain
as looked up to with longing for relief; but no patriot was
und ſo hardy as to encounter the whole landed intereſt of
cotland in ſo benevolent a deſign: Till, on occaſion of the
te rebellion, thoſe wiſe heads, who planned the reformation
f ſeveral of our laws, ſaw with compaſſion the miſerable de-
ndance and ſlavery wherein the tenants were thus held by
eir lords; and, with a generoſity becoming the legiſlature of
free people, relieved them of that unlimited burden, and
hereby, ſo far as poſſible, communicated to them that liberty
hich is the birth-right of every Britain.

I have been led into theſe thoughts, by conſidering another
nd very grievous branch of oppreſſion which ſtill infeſts the
hole tenants of the country; I mean the thirlage and aſtric-
on to mills, and which was left untouched by the legiſlature,
ough it loudly calls for redreſs.

As nothing is a greater ſpur to induſtry than a free and un-
mited diſpoſal of its fruits to the beſt advantage; ſo on the
ther hand, nothing can diſcourage it more than reſtrictions
nd limitations, which become real fetters upon induſtry. In

ſequence of this ſervitude, the tenant cannot carry his corn to market when a good price offers; no, he muſt neceſſarily carry them to the mill of the thirle to be grinded, where they are ſubjected to a very ſevere tax, under the name of multure, which at ſome mills is an eleventh, at others a thirteenth, a fifteenth, and ſeldom ſo low as a twentieth part of the whole. If he is ſo hardy as to ſell his grain, it muſt either be under a condition of their being grinded at that mill, or he is ſubjected to a proſecution for abſtracted multures. But this is not all; he muſt alſo ſatisfy the rapacity of the inferior ſervants of the mill, who, if fame ſays true, are ſeldom much addicted to honeſty. Temptation is a great enemy to honeſty; and the great opportunities which the tackſman and all his ſervants have to commit frauds, too often lead them beyond the limits of ſtrict juſtice. Their ſeveral mill-dues are taken in kind from the tenants grain; and in all the mills of my acquaintance, perhaps it is ſo over all Scotland, by meaſure or diſhes as they are called, which are not any determined part of the ſtandard meaſures of the country, but eſtabliſhed by long uſe in the mills; and theſe are not filled and ſtreaked, but heaped or tramped, at the pleaſure of theſe millers; ſo that the employer cannot be certain, whether he pays the juſt dues and no more or not.

It would be hard and cruel to involve all of them in the ſame general accuſation: That there may be honeſt men among them who can doubt; but certain it is, that the general prejudice is againſt them. Many frauds, many concealed apartments and devices to ſmuggle the tenants grain, have been diſcovered, which have ſupported that prejudice; and the warm *been* houſe of the tackſman and his ſervants, which has gone into a proverb, his gay cloaths, his fat horſe and cattle, ſupport the imputation of their often multuring twice.

This ſervitude, ſo grievous, to tenants and thoſe aſtricted, in its own nature, and conſequentially ſo productive to vill iny and fraud, have been long felt and complained of, without

any redreſs. It is apparently an additional rent upon the tenant, and an addition, the extent of which, from the circumſtances above mentioned, cannot be determined: It is likewiſe a real loſs to the landlord; for a miln rent is never reckoned of equal value with land rents, as being a ſubject unimproveable; and becomes a draw-back in the ſale of lands. Whereas, were the miln rent, ſo far as it depended upon aſtriction, to be laid proportionally upon the tenants, they would chearfully pay it as an addition to their rents, the extent of which would then be determined; and the landlord, beſides the rent of his miln, to be ſet as a manufacturing miln free of hurle, could then reckon upon the whole rents of his eſtate at an equal number of years purchaſe, without the draw-back of a miln rent.

Some landlords of more extended views have begun this work of reformation, to the great ſatisfaction of their tenants. But the progreſs of this reformation will be too ſlow for the geral call that the country has for improvement; and an invincible bar ſtands in the way, where lands are thirled to milns not the property of the landlord; and will make the interpoſition of parliament neceſſary and indiſpenſible. Without any violation of private property, the wiſdom of parliament could certainly fall upon a rule of fixing an equivalent to the proprietor of the miln for his thirlage; and whatever the landlord ſhould pay on that account, will, I am convinced, be chearfully recompenſed him by his tenants, in the additional rent they would readily ſubmit to for this freedom. The milns would not for all this be the leſs employed; only it ſhould be provided that their dues ſhould either be paid in money; or, if in grain, by the known and eſtabliſhed meaſures and weights of the country; and then they would become like any other manufactory, their employment would depend upon the cheapneſs of the manufacture, and the civility and diſcretion of the manufacturer.

This is a matter that few gentlemen have perhaps ever thought much about; but I can aſſure them, both from my

own

own obſervation, and that of all my acquaintance of the farmer tribe, which is pretty general, it is a matter to them of very ſerious concern. Nothing is more neceſſary for a tenant than to know preciſely what is his rent: Nothing is more agreeable to him than to pay that rent to his proper landlord: But when over and above the rent conditioned to be paid to his landlord, he is ſubjected to an uncertain tax, which cannot be liquidated and brought into calculation; and when he muſt pay that tax to a parcel of thankleſs knaves, under the various deſignations of multures, ſervices, bannock, and knaveſhip†, a name very properly aſſumed from the characters they juſtly deſerve, he is diſappointed in both his views; and cannot help grudging the impoſition.

I have ventured to ſend you theſe my reflections on this ſubject; which if you ſhall think worthy a place in your book, I am hopeful it may be the means of inciting ſome of our great men of intereſt above to procure relief in this particular, by obtaining an act of parliament for that purpoſe. And am, &c.

Clackmannan,
25*th* Jan. 1773.

† We beg leave to ſet our correſpondent right in his application of the word *knaveſhip*, which is indeed taken from the word *knave*, but before it was uſed in a bad ſenſe: Knave originally ſignifying a ſervant, as in the old Engliſh tranſlation of the New Teſtament, Rom. chap. 1. *Paul the Knave of Jeſus Chriſt.* Knaveſhip was originally all the fee that was paid at the mill for their ſervice in grinding the corn: But the millers, or knaves of the mill, having by extortion raiſed theſe fees very high, from which probably the word got its bad meaning, the maſter appropriated them to himſelf, which he afterwards ſet in tack; and a leſſer fee was fixed for the ſervants, now known under the name of Lock and Bannoch, or Knaveſhip. We hope our correſpondent will excuſe us for omitting ſome warm expreſſions, and ſoftening others uſed by him againſt the miller and his ſervants, which the heat of his zeal had extorted from him; for which the liberty allowed us in his poſtſcript was our authority.

ARTI-

ARTICLE XL.

Of the bad Oeconomy of our common Farmers, and Hints for amending it.

[In a letter to the Publiſher.]

IF you think the following thoughts deſerve a place in your paper, you may inſert them; if not, my trouble in throwing them together has not been great.

I have read with pleaſure four numbers of your publication, and am of opinion, that, if this work is carried on with the ſame ſpirit it has begun, it may tend very much to the improvement of our country. I am ſingularly happy to ſee, that you have already got ſeveral actual Farmers for your correſpondents, and I hope the number of theſe will encreaſe, as it is from them that we are to expect the reſult of different experiments, the theory of which we find in books, but the ſucceſs can only be learned from them. And I would recommend much to ſuch correſpondents, to be careful, during the courſe of their operations during the different ſeaſons, to minute down, as particularly as their time will permit, their different modes and times of performing their plowings, ſowings, &c. with an account of their increaſe: This, I imagine, would be a very pleaſant amuſement to themſelves when not employed in the field, and might prove extremely uſeful to their countrymen.

Agriculture is no doubt, of all other employments, not only the moſt agreeable and healthful, but likewiſe the moſt intereſting to the community; as upon it chiefly depends the welfare of the community. I have had occaſion to view the ſtate of improvements in different counties of Scotland, and with ſome concern have found, that in moſt parts the middling farmers are in general in a much leſs flouriſhing ſituation than

than could be wiſhed. I have been likewiſe at ſome pains in making inquiry into the cauſe of ſuch want of ſucceſs in theſe laborious people; from their own accounts of this matter, one would be apt to attribute their many failures to the rents of their farms being higher than they can afford to pay, being almoſt equal, as they alledge, to the whole produce, after deduction of neceſſary expence: But I am far from being of opinion, that the want of ſucceſs in theſe farmers is owing in general to the rents being too high, though no doubt every farmer ought particularly to attend to that circumſtance, in taking a leaſe. I am much more inclined to attribute their want of ſucceſs to this ſingle error, more than any other circumſtance, the undertaking the labouring of a greater quantity of land than their ſtock enables them to manage in the moſt profitable manner; their being pinched in this reſpect induces them to go on, tearing the very heart and ſubſtance out of their land, till they have reduced it to a ſituation next to barronneſs; the natural conſequence of which muſt unavoidably be, the reducing themſelves to beggary. I do not mean, by what I have ſaid, to maintain, that none but the rich ſhould become farmers. I would only moſt earneſtly recommend to every perſon undertaking that profeſſion, not to enter upon the management of a farm of greater extent than his ſtock will enable him to manage, in ſuch a manner as to reap the full profits that can ariſe from the moſt perfect plan of husbandry. The moſt capital error I perceive in the general run of management is, the having too great a proportion of the farm under tillage, and the taking from the whole of that part by far too many impoveriſhing crops. The farmer ought to conſider, what an expence labouring is attended with, eſpecially when performed by horſes, and how little the profit ariſing is, whenever the crop is ſcanty, which muſt always be the caſe when the land is ſcourged: On the contrary, how profitable, when the crop is great, and when he reflects with himſelf, he will find that ſuch profitable crops are by no means

means to be raiſed, otherways than by purchaſing of manures at a very conſiderable expence, or by introducing a new plan of huſbandry; I mean, the having much leſs of his land in tillage, and the ſowing of graſs ſeeds, by which means he will be enabled to acquire a much greater quantity of manure than in the ordinary management. The part of his land in tillage will be much better laboured: The part lying in graſs will be likewiſe becoming more profitable, and his circumſtances upon the whole greatly bettered. With reſpect to the proper proportions between the ſtock and quantity of land to be occupied, the arrangement of crops, and how much ought to be conſtantly in graſs, I leave with your practical correſpondents to determine: But I conclude, with aſſerting, that no more land ſhould be kept in tillage, than the farmer is able to dreſs, in ſuch a manner as to be kept perfectly free from weeds and in good heart.

I am, Yours, &c.

Edinburgh, 9th. March 1773. A. B.

FIARS

FIARS for the counties of Edinburgh, East-Lothian, Aberdeen, and Banff.

FIARS for the ſhire of Edinburgh, for crop 1772.

	Sterling £.	s.	d.
Beſt wheat, *per* boll	1	2	6
Blacked wheat	1	0	10
Beſt barley	0	17	6
Blanded bear	0	15	6
Rough bear	0	14	6
Beſt oats	0	14	6
Muirland oats	0	12	6
Meal by weight, 8 ſtone per boll	0	16	8
Peaſe	0	15	0

FIARS of East Lothian, for crop and year 1772.

	Sterling £.	s.	d.	
Beſt wheat	1	2	4	halfpenny
Second wheat	1	1	1	halfpenny
Third wheat	1	0	2	
Beſt barley	0	18	4	halfpenny
Second barley	0	17	3	halfpenny
Third barley	0	16	11	halfpenny
Beſt oats	0	14	10	farthing
Second oats	0	14	2	farthing
Third oats	0	12	8	halfpenny
Beſt peaſe	0	14	7	halfpenny
Second peaſe	0	14	2	
Third peaſe	0	12	10	halfpenny

FIARS of the county of Aberdeen, for crop and year 1772, ſtruck upon the 19th of February 1773.

	Scots £.	s.
Great oats, with fodder, *per* boll	12	12
Ditto without fodder	8	14
Brocked oats with fodder	11	2
Ditto without fodder	7	10
Small oats with fodder	8	0
Ditto without fodder	4	4
Bear with fodder	14	0
Ware bear with fodder	10	10
Ditto without fodder	8	8
Farm or market bear without fodder	11	2
White meal, nine ſtone	10	0
Farm meal, eight ſtone	8	14
Market meal	9	12
Peaſe	8	14
Wheat	13	0
Rye	8	14

FIARS of the county of Banff, for crop and year 1772, ſtruck upon the 1ſt of March, 1773.

	Scots. £.	
Wheat, *per* boll	12	1
Beſt bear with fodder	14	1
Ditto without fodder	10	1
Beſt oats with fodder	12	
Ditto without fodder	8	
Second bear with fodder	13	
Ditto without fodder	9	
Second oats with fodder	10	1
Ditto without fodder	7	
Oat-meal	8	1
Peaſe	8	1

THE SCOTS FARMER,

APRIL 1773.

ARTICLE XLI.

Of the plough with the curved mold board—Of the feathered ſock—Of the wheeled plough—Of the four-coultered plough—Of the iron plough—Of making the Scots plough.

[Dickſon's Agriculture, Vol. I.]

Of the Plough with the curved mold-board.

THE mold-board of the Scots plough, as has already been deſcribed, is not quite ſtreight, but is caſt outward above, and more and more ſo as it approaches the leſſer handle.

Ploughs that have a curved mold-board, commonly have no wreſt, the mold-board ſerving for both. The under part of it, that ſerves in place of the wreſt, as it approaches the handle, becomes parrallel to the plane of the head, and ſometimes after it has paſſed the handle, is made to turn a little inwards; and the fore part of it, which is ſtreight below, is curved more and more the further up it comes, reſembling the bow of a ſhip.

If one mold-board is preferable to another, it muſt be for one of theſe two reaſons; either becauſe it throws the earth of the furrow more properly, or makes the plough more eaſily drawn.

It will not be amiſs that we examine the curved mold-board with reſpect to both theſe, and compare it at the ſame time with the common mold-board.

It was obſerved, that the earth of the furrow taken off by the coulter, is raiſed by the ſock from the left ſide, and as the plough moves forward, is thrown to the right ſide of the ſheath. Now the uſe of the mold-board is to raiſe the earth,

turn it over, and if it is taken off narrow, to ſhift it a little to the right hand. The common mold-board with the wreſt, if right made, does theſe things altogether and gradually; it gradually raiſes up the earth of the furrow; as it raiſes it up, it turns it over; and as it turns it over, it ſhifts it a little to the right hand, and leaves it either ſtanding on its edge or ſide, or turns it quite over, as it is itſelf caſt outwards above by the handle. The curved mold-board acts differently: as it is caſt out above in the fore part, it prevents the furrow from riſing, it turns it over ſuddenly, and if it needs to be ſhifted to the right hand, this is done after it is turned over. In land that eaſily breaks in pieces, the common mold-board ſeems to have the advantage; for as it raiſes the earth of the furrow higher than the other, it leaves it more looſe and open, and better expoſed to the influence of the air; but in land that is not eaſily broke, the curved mold-board ſeems to have the advantage; for by turning over the earth of the furrow ſuddenly, it is apter to tear it aſunder in turning it than the common mold-board, which turns it over more gradually; and by ſhifting it to the right hand, after it is turned over, is apt to bruiſe it. It is certain, that the earth of the furrow, by being turned over gradually, and ſhifted as it is turned, will continue whole in ſome ſoils, in which it will be broken if turned over ſuddenly, and will be bruiſed if ſhifted after it is turned.

The other thing mentioned, which makes one kind of mold-board preferable to another, is the making the plough more eaſily drawn. Let us then conſider the curved mold-board alſo with a view to this, and compare it at the ſame time with the common mold-board. It is obvious, that in this reſpect the common mold-board has the advantage; for though it may be allowed, that the friction made by the hind part of the mold-board is leſſened by its being curved, yet the friction in general is rather increaſed, as this is more than balanced by the greater reſiſtance which it

meets with on the fore part, in turning the earth of the furrow. Some perſons have been led to imagine, that the curved mold-board makes the plough more eaſily drawn, from the reſemblance it has to that ſhape of the ſide of a ſhip, which, experience teaches us, paſſes moſt eaſily through the water: but certainly there is a great difference betwixt the motion of a body through a fluid, driven by the wind acting upon places raiſed above the body, and the motion of a body through the earth, pulled by the end; and therefore there can be no juſt reaſoning from any analogy betwixt them *.

It is certain that the curved mold board, by turning the earth of the furrow ſuddenly by the fore part of it, meets with more reſiſtance than the common mold board in that place; and if the earth is ſhifted to the right hand, the curved mold-board muſt preſs upon it after it is turned, as the plough moves forward, which makes the friction on the hind part of the mold-board, perhaps, nearly equal to that upon the common mold-board when it turns the furrow. To illuſtrate this, let

A

* There are a variety of reaſons for making a ſhip narrow behind; thereby the helm has the greater command; the centre of gravity is nigh the middle, and the keel placed parrallel to the ſurface; and, no doubt, the friction is leſſened. There is alſo a good reaſon for making the fore part of a ſhip narrow below, and gradually to caſt outward above; this is not done becauſe it is the ſhape that goes with the greateſt eaſe through the water, but becauſe it is neceſſary to prevent the head of the ſhip from being buried, and to keep the keel parrallel to the ſurface, while the ſhip is ſailing. If this was a proper place, it might eaſily be ſhown that the force impreſſed upon a ſhip by the wind, at the top of the maſts, would force the head under water, if it was as narrow above as below; and that the reſiſtance which the head meets with, by being caſt out above, prevents it from going down, and makes the ſhip ſpring forward.

A B repreſent the firm land; ſee fig. 14.; C D the earth of the furrow already laid up to the plowed land; G H the earth of the furrow which the plough is taking from the firm land; I K the ſame earth laid to the plowed land; E the furrow which the plough made, when it laid up the earth C D, and F the furrow made, when it laid up the earth I K. Let L repreſent the place where the curved mold-board turns the earth of the furrow. Now, it is obvious, that the mold-board, in moving forward, muſt preſs the earth K L in laying it cloſe to the earth C D; whereas, if the earth is not turned over at L, but only raiſed up and turned over gradually, as it approaches the earth C D, thereby it has freedom to move, and does not give ſuch reſiſtance to the mold-board as when turned over at L. In this reſpect, then, the curved mold-board ſeems to have no advantage over the common mold-board; on the contrary, ſeems to make the plough rather heavier to draw.

It is neceſſary to obſerve, that in comparing the mold-boards with each other, we have ſuppoſed the ſheaths to which they are fixed in the ſame poſition: for the effects of both are different, according to the poſition of the ſheath. If the ſheath to which the curved mold-board is fixed ſlopes much backward, ſo as to make the angle contained by it and the head much leſs than ſixty degrees, then the earth is ſufficiently raiſed before it touches the upper part of the mold-board, and is turned gradually as it is raiſed; ſo that a curved mold-board with a ſloping ſheath has the ſame effect as the common mold-board with a more upright ſheath.

Of the plough with the feathered ſock.

The difference betwixt the feathered ſock and the common ſock, will be the beſt underſtood by comparing them together in the figures. Fig. 15. is the common ſock, and fig. 16. is the feathered ſock †.

† The feather of the ſock is called by the Engliſh writers, *the fin of the ſhare.*

It is obvious from the conſtruction of this ſock, that it meets with greater reſiſtance than the common ſock; for it is broader before, and does not ſlope ſo gradually, and therefore makes the plough not ſo eaſily drawn. However, it is not ſo in every caſe. When the plough takes off the earth of the furrow broader than that part of the ſock that goes upon the head, then it is more eaſily drawn with the feathered ſock, than with the common ſock; for the firm earth which the common ſock leaves to be opened by the wreſt, is opened by the feather of the other ſock, which is done much more eaſily. Neither is the plough with the feathered ſock heavier to draw in every kind of land. In lea, or land that has upon it a tough ſward of graſs, this ſock makes the plough eaſier to draw. The reaſon of this is obvious: The roots of the graſs go beyond the reach of the plough; and it is much eaſier to cut theſe, as the feathered ſock does, than to tear them aſunder, as is done by the common ſock. The plough, then, with this ſock is very proper for opening up graſs ground.

But the plough with this ſock is not only more eaſily drawn, than the plough with the common ſock, in ſome lands, but alſo in ſome lands makes better work. In lands where there are root-weeds, it deſtroys theſe weeds much more effectually; for many of the roots, which the common ſock ſlips by, or paſſes over, are cut by this feathered ſock, and thereby the weeds themſelves deſtroyed. But then, it is to be obſerved, that the common ſock has greatly the advantage in ſtonny land; and of this kind is a great part of our land in Scotland: for the common ſock, by the ſharpneſs of its point, and the gentleneſs of its ſloping towards the head, eſcapes many ſhocks from the ſtones, which would put the plough with the feathered ſock out of its direction, and endanger its being broken to pieces.

It is proper to add, that in fitting this ſock to the head, it is neceſſary to turn the point from the land, or a little to the right hand. This is contrary to what was before directed,

with

with reſpect to the common ſock. But the reaſon is obvious: This ſock, if fitted on quite ſtreight, will have its left ſide exactly in a line with the left ſide of the head, and parrallel to the direction of the draught, and therefore can receive no reſiſtance from the land ſide: all the reſiſtance it meets with is from the furrow-ſide, which gives the plough a tendency to go into the land; and to prevent this, it is neceſſary to turn the point of the ſock a little towards the furrow: this leſſens the reſiſtance from the furrow ſide, and makes it meet with ſome reſiſtance from the land-ſide.

Of the wheeled Plough.

The wheeled plough uſed in Scotland is different from the one uſed in England, as deſcribed by the writers on huſbandry. The Scots wheeled plough is formed by adding the wheels to the old Scots plough, and giving it a curved mold-board, and feathered ſock, as perſons fancy. Theſe have already been conſidered, and therefore, the only thing which we are here to inquire into, is, the advantage or diſadvantage of the wheels.

Some perſons are of opinion, that wheels to a plough leſſen the draught. When the beam is raiſed and placed upon an axletree with wheels, by the drawing of the cattle there is a preſſure upon the wheels. In proportion to this preſſure, the friction of the plough is leſſened; and in proportion as the beam is raiſed, is this preſſure encreaſed. Now, if the ſtrength neceſſary to overcome the friction is greater than the ſtrength neceſſary to overcome the preſſure, the draught muſt be leſſened. Was it not for the weight of the machinery, which is an additional preſſure upon the wheels, the ſtrength required to overcome the preſſure, would be to the ſtrength neceſſary to overcome the friction, as the circumference of the wheel is to the axletree. But as, in the common wheeled plough the preſſure upon the wheels is but ſmall, the friction cannot

be leſſened in any great degree; and therefore the wheels in this reſpect are of no conſiderable advantage to the plough.

In other reſpects the wheels, no doubt, are of advantage: they regulate the plough, make it go to a certain depth, and take off the earth of the furrow of a fixed and certain breadth, and they make the plough very eaſily managed.

One of the wheels goes in the furrow, and the other on the unplowed land; the beam reſts upon the carriage of the wheels; and as it is thereby kept at an equal diſtance from the ſurface, the plough muſt be kept alſo at an equal and certain depth.

One of the wheels is always confined to the bottom of the furrow; this makes the plough always take off an equal and certain quantity from the land.

The plough being fixed to a certain depth and breadth, is eaſily managed; and ſo little attention is neceſſary from the man that holds the plough, that he may alſo drive, when two horſes are ſufficient for the draught; for having nothing to do but keep the plough even, he may uſe one of his hands when neceſſary for the direction of the horſes.

But we may mention as another advantage of the wheels, that they make it eaſy for the plowman to keep the ridges ſtreight. A farmer, after he has laid out a field in ſtreight ridges, finds that few of the ordinary plowmen can keep them in this ſituation; and indeed it is ſomewhat difficult to do this; for, in order to it, the firſt furrow of the ridge muſt not only be drawn quite ſtreight, but alſo the earth of every ſucceeding furrow muſt be equally broad in all parts of the ridge. If the firſt furrow is drawn ſtreight, that part of the ridge where the plough begins will indeed be ſtreight: but if the plough takes off the earth of the furrows broader at one end than another, that part of the ridge where the plough ends, will be crooked. Now, it requires great attention in the plowman to prevent the cattle from going in ſuch a manner, as to make the earths of the furrows either broader or narrow-

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er at the ends of the ridge than in other parts of it; for i
the hand to which they are accuſtomed to turn, they naturall
tend before they reach the end of the ridge; and this makes th
plough, according as the cattle turn, take off more or leſs tha
in other parts of the ridge. The wheeled plough in a gre
meaſure prevents this; for as one of the wheels goes in the fur
row, it cannot be pulled out without difficulty; and any at
tempt to do this makes ſuch an alteration in the going of th
plough, as to call the attention of the plowman.

Theſe are the advantages of this plough: it has its diſad
vantages likewiſe; when compared together, they will proba
bly be found pretty nearly to balance each other.

It has too much machinery, which in every inſtrument i
an inconvenience. For the more machinery there is in an
inſtrument, it is the more liable to be broken, and the mor
difficult to get it mended.

It is not proper for plowing acroſs ridges. When th
cattle have paſſed the furrow, and are going up towards th
crown, the draught being thereby raiſed, while the pl ugh
on the deſcent, the fore part of the plough is raiſed likewiſe
and the plough itſelf, perhaps, brought quite out of the ground
and, on the other hand, when the cattle have paſſed the crow
and going down towards the furrow, the direction of th
draught being thereby made lower, the plough is forced i
too deep. This does not happen to the common plough; fo
the plowman can either reſt upon the handles, or lift them u
a little, as he finds it neceſſary; and thereby make the plough
go deeper, or ſhallower, than otherwiſe it would do.

This plough is likewiſe troubleſome, when plowing na
row ridges; for it muſt be frequently altered in plowing o
a ridge. The wheel that goes in the furrow being high
than the other, when both wheels are going upon the ſurfac
the beam muſt be changed from its ordinary poſition, an
placed in ſuch a manner, as to keep the plough even, and
make it go a little deeper than ordinary. When a furrow
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made for the wheel to go in, the beam muſt be changed to its ordinary poſition; and when the ridge is near finiſhed, ſo that both wheels are going in furrows, the poſition of the beam muſt be again changed to keep the plough even, and to prevent it from going in too deep.

It will not be improper to mention another thing, which ſome perſons reckon an advantage in this plough, but which, when ſeriouſly conſidered, will appear rather a diſadvantage. It is ſaid, that, where the ſoil is ſhallow, the plough being fixed to a certain depth, can be made to take up all the good earth, without ſtirring the till; whereas, when this is left to be regulated by the plowman with a common plough, they are ſo inattentive, as to leave good ſoil in ſome places, and turn up till in others. At firſt ſight, one naturally thinks, that, in this reſpect, the wheel-plough is preferable; but, upon trial, the reverſe is found true. The reaſon is this: There is ſcarcely a field where the ſoil is equally deep in all places; if the ridges are high, it is always deeper in the crowns than in the furrows. If the wheeled plough, therefore, is ſet in ſuch a manner, as not to touch any of the till, where the ſoil is ſhallow, it will not reach the good ſoil where it is deep: and, on the other hand, if it is ſet in ſuch a manner, as to reach the good ſoil to a conſiderable depth, it will turn up the till where the ſoil is ſhallow. This plough then is not ſo proper an inſtrument for ploughing land of this kind, as the common plough; which, from its make, is ſet to a certain depth, and will go at that depth, if not incommoded; but, however, can be made to go deeper, or ſhallower, by the plowman, as he ſees neceſſary.

Of the four-coultered plough.

This plough is greatly recommended by ſome writers on huſbandry, ſince Mr Tull's time.

In England, it is, perhaps, uſed with ſucceſs; but the attempts to introduce it into Scotland have hitherto proved unſucceſsful.

ſucceſsful. After ſeveral trials to no purpoſe, thoſe that were fondeſt of it have been obliged to give it up.

The deſign of treating of this plough here, is to point out its defects; or, rather, to ſhow the reaſons which have rendered it impoſſible to plough with any of this kind, as yet tried in Scotland. This may be of uſe to thoſe who are ſtill deſirous of introducing this plough; for, if it is known where the defects lie, we will at leaſt be able to judge if it is poſſible to remove them.

Any perſon that conſiders the conſtruction of this plough, particularly the three additional coulters, will immediately obſerve, that it muſt be very difficult, if not impoſſible, to make it go right. So many coulters in the ground all at once muſt meet with many obſtacles; and theſe obſtacles will give the plough different directions, according to the different places of the coulters, to which the reſiſtance is given: and the different directions, given, perhaps, at the ſame time, or ſuddenly after each other, muſt greatly incommode the going of the plough. Beſides, it is difficult to place the planes of the coulters exactly parallel to each other; and, if this is not done, they will be continually acting upon the plough in different directions. We may obſerve likewiſe, that if this plough is uſed for breaking up graſs-ground, which is the chief deſign of it, the oblique poſition of the coulters will raiſe the turf in ſuch a manner, as to entangle it betwixt them, and thereby entirely prevent the plough from going. This will the more readily happen, if the beam is near the ſurface, and the coulters ſhort: and, on the other hand, if the beam is at a diſtance from the ſurface, and the coulters long, the obſtacles which they meet with will have the greater influence on the plough, and the coulters themſelves be the more eaſily broken, or put out of their place.

Some perſons who have made trial of this plough, have had it made without wheels: but this certainly was ill-judged; for the wheels ſeem abſolutely neceſſary for regulating the plough

plough when going, and preventing the different ſhocks which it receives, from putting it out of its direction.

Some perſons have tried this plough upon land, the ſurface of which was very hard; but this was likewiſe ill-judged; for, the harder that the ſurface is, the coulters meets with the greater reſiſtance, and the plough is in the greater danger of being turned out of its direction.

Theſe things are mentioned, not to deter perſons from making further trial of this plough; but to hint how the trial may be made, in ſuch a manner as has the beſt chance of ſucceeding. In order to this, the following things ſeem neceſſary: That the plough be made with wheels; that the planes of the coulters be placed exactly parrallel to each other: that the firſt coulter be ſet almoſt perpendicular, and go not above two inches deep: that the ſecond ſlope but a little, and go but a little deeper; that the third ſlope a little more, and go a little deeper than the ſecond; and that the plough be uſed on land where there are feweſt obſtacles. The kind of land that ſeems moſt proper for it, and which too is moſt difficult to reduce, is ſoft meadow-land, that is free from ſtones, and has upon it a tough ſward of graſs. The ſoftneſs of this land gives the leaſt reſiſtance to the coulters, and the leaſt diſturbance to the plough.

It is ſomewhat ſurpriſing, that perſons have not tried a plough with two coulters, ſuch as is deſcribed by ſome of the Engliſh writers on huſbandry, before they attempted one with four. If two can be placed in ſuch a manner as to anſwer, a third may then be added, and afterwards a fourth. But, if it is found that two are attended with inconveniences, it is vain to attempt four.

In the directions given by Mr Tull, for making the four-coultered plough, it appears that a furrow ten inches broad is taken off by it; which, to be divided into four by the coulters, muſt require a great ſtrength to the plough. If the plough with two coulters is made to take off a furrow ſix inches

ches broad, the work will be almoſt as well done, and with much leſs ſtrength This plough will not, indeed, do near ſo much work as the four-coultered plough; but little leſs than is done in the common way of clean plowing, in thoſe parts of the country where this work is beſt performed.

The chief deſign of this four-coultered plough, is to break up graſs-ground It is certain that the ſward is not ſufficiently torn aſunder, and broken, when the land is plowed in the ordinary way; and therefore any contrivance, to facilitate the reducing this kind of land to a proper tilth, is, no doubt, a great improvement. Trench-plowing, which is propoſed by ſome where the ſoil will allow, ſeems to be more proper for this, than plowing by the four coultered plough. But this ſhall be conſidered in its proper place.

Of the iron Plough.

This plough is formed upon the model of the old Scots plough. The ſeveral parts of it are ſhorter, and the head and ſock are of one piece, like the Engliſh plowſhare. The plate that is in the place of the mold-board, may be made either plain or curved; and the ſhare may be made either with, or without a fin. The only things to be conſidered, in comparing this plough with the old Scots plough, are the advantages or diſadvantages, ariſing from its being made of iron, and having ſome of its parts ſhorter.

It is not propoſed here to compare theſe ploughs, with reſpect to the expence of purchaſing; or to conſider, whether the laſting of the iron plough, and the value of the iron, when the plough is become uſeleſs, do not ſufficiently ballance the leſs expence of the common plough at the firſt purchaſe. The only things which we are to conſider, are, which of the two is moſt eaſily drawn, and makes the beſt work.

It is certain, that this plough is more eaſily drawn than any other uſed in Scotland. It is lighter than the common

plough

plough, when equally ſtrong. The head and other parts of it that go in the land, being ſhorter and narrower, there muſt be leſs friction; and the fore part of the head, or what, in England, is called the *neck of the ſhare*, being narrower, and the ſheath being thinner in the edge, it muſt meet with leſs reſiſtance. And it may be added, that this plough, being made of iron, and each part exactly fitted to another, the earth does not ſo eaſily ſtick to it, and clog it while going.

But thoſe things which make this plough eaſier drawn than the common plough, are, in other reſpects, real defects. The lightneſs of it, and particularly the ſhortneſs of the ſhare, which are the principle things that render it eaſy drawn, make it go very unſteadily where it meets with obſtructions The heavier that the plough is, and particularly the greater the diſtance is betwixt the end of the head and point of the ſock, it is the more difficult to force it out of its direction; and, on the contrary, the lighter that the plough is, and the ſhorter this diſtance, the plough is the more eaſily turned to a ſide. Now, as this plough is ſo much lighter, and ſo much ſhorter, than the common plough, it muſt be ſo much the more unſteady. The ſmall diſtance, from the point of the ſock to the point of the coulter, makes this plough likewiſe more unſteady than the common plough: for the ſmaller that this diſtance is, the opener is the land in which the point of the coulter goes; and therefore the coulter itſelf can make the leſs reſiſtance, when the ſock meets with any ſhock that tends to put the plough out of its direction *. The

* Every common plowman will tell you, that, when the plough irons are ſhort, his plough *goes kittle*. By this he means, that it is eaſily turned aſide, and is difficult to manage. He knows likewiſe that this is the caſe, when the points of the irons are near each other. The iron plough is in the ſame ſituation with the common plough; when its irons are ſhort, and the points of them near to each other, it is eaſily turned out of its direction, and is troubleſome to manage.

The advantage then of this plough is, that it is eaſily drawn; the diſadvantage is, that it is eaſily put out of its direction. Theſe things point out the kind of land for which it is moſt proper. It is not proper for ſtony land, or land which riſes in hard clods; but it will anſwer very well in land that is ſoft, and in which there are few things to put it out of its direction †. It may be added, that the better the lands are improved, this plough will be found the more uſeful.

There is one thing that will make it very difficult to introduce this plough; and that is, it is very inconvenient for the plowman: for he is obliged to carry it to the ſmithy, at, perhaps, a conſiderable diſtance, whenever any thing about it breaks, or goes wrong; or even when what are commonly called the *plough-irons* need to be laid, or ſharpened, which is frequently happening when the land is hard. When any part of the common plough breaks, which can be mended without taking the plough aſunder, the wright goes to the field and does it; and, when the irons need to be laid or ſharpened, the plowman takes them off. But none of theſe things can be done with the iron plough. Whenever it needs any thing to be done to it, the plough itſelf muſt be carried to the ſmithy. This, as it is an inconvenience to the plowman, will frequently likewiſe be inconvenient to the maſter; for there are many plowmen that are diſpoſed, from lazineſs, to work with an ill-going plough, rather than be at ſo much trouble as to carry it to a place at any diſtance.

† This plough is proper not only for all kinds of light land that are free from ſtones, but alſo for clay-land, when not too dry. When clay is ſo ſoft, as to turn over with whole furrow, the iron plough goes very eaſily through it; but when it is ſo hard as to riſe in clods, the ſhocks that theſe clods give the plough continually incommode it.

Of ſome general things to be obſerved in making the Scots plough.

This plough has already been particularly deſcribed, and the uſes of its different parts ſhown. By attending to theſe things, it may be known when it is right made. However, It will not be amiſs to mention ſome of the principle things neceſſary to be attended to; and we ſhall endeavour to do this in ſuch a manner, as to be underſtood by thoſe who are chiefly concerned about ploughs.

In making this plough, care muſt be taken that the big ſtilt and the ſheath be fixed in ſuch a manner to the head, that when the beam is fixed to them, it may be exactly in the ſame direction with the head, and point neither to the land-ſide nor the fur-ſide ‡. If the beam points to the fur-ſide, the plough will have too much land; and if it points to the land-ſide, the plough will have too little land. When an error of this kind happens, the wright will endeavour to rectify it by the way of fitting on the ſock, and the plowman by the way of putting in the coulter. But if the error is great, the plough thus ſet right by the way of fitting on the ſock, will be heavy to draw, will go very kittle, and be in danger of breaking. The reaſon of this is obvious: The plough goes with its ſhoulder foremoſt inſtead of the points of the irons; this makes it heavy to draw; the head and the ſock bear againſt one another; this makes it go kittle: and the draught not being along the head, is in danger of breaking the ſheath, or tearing the joints. If the plough is ſet right by the way of putting in the coulter, the plough will be heavy to draw, and the coulter in danger of breaking, or being put out of its place: for the coulter

‡ There is no matter though the beam points a little to the fur-ſide; for the land that is thereby given to the plough, is in ſome meaſure balanced by the ſock having leſs reſiſtance given from the fur-ſide than from the land-ſide.

coulter not going with its edge foremoſt, meets with greater reſiſtance, and thereby not only incommodes the plough, but is alſo in danger of breaking or looſing the wedges by which it is fixed to the beam.

Care muſt be taken likewiſe to place the beam in ſuch a manner as to give the plough neither too much nor too little eard. If the beam is placed too high, the plough will have too much eard; and if it is placed too low, the plough will have too little eard. The wright determines the poſition of the beam in this manner. After he has fixed the big ſtilt and the ſheath to the head, and fitted the beam to the big ſtilt and the ſheath, he applies a rule along the under ſide of the head, which he extends forward as far as the point of the beam, and then he meaſures the neareſt diſtance from the rule to the place of the beam thro' which the hole is to be bored for the bolt of the muzzle, and he adjuſts the beam ſo as to make this diſtance greater or leſſer, according as the plough is to be yoked. If the plough is to be drawn by oxen, he makes this diſtance greater; if by two horſes abreaſt, he makes it leſs; and if by four horſes two abreaſt, he makes it leaſt of all. If he finds he has committed any error in this, he endeavours to rectify it by the way of fitting on the ſock. If the error is great, he ſhould not be allowed to do this, but ſhould be obliged to alter the poſition of the beam, which may be done with very little trouble. If the error be rectified by the way of fitting on the ſock, the plough will either go upon the points of the irons, which will make her go very kittle, and at the ſame time make a bad fur; or the head will go lower than the point of the ſock, which will make the plough very heavy to draw.

In fitting on the ſock, care muſt be taken to make it ſtreight with the head, and the coulter muſt be placed ſo as the point of it may be as low as the point of the ſock, and as far forward or a little before it, and, at the ſame time, a little to the land-ſide, that ſo it may be in a line with the land-ſide of the

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head. This position of the coulter gives the plough a little more land; but this is balanced by the plough being confined on the land side, and at liberty on the fur-side, which naturally gives it less land. If this position of the coulter is overbalanced by the freedom of the plough on the fur-side, it is necessary to give the plough more land by the sock; for it is improper to turn the coulter further to the land-side than to be in a line with the land-side of the head.

It has been said, that if there is an error in the original make of the plough, the wright endeavours to rectify it by the way of fitting on the sock. He does it in this manner. If the plough has too much land, he turns the point of the sock to the fur-side; if it has too little, he turns the point of the sock to the land-side; if the plough has too much eard, he turns the point of the sock a little upwards; and if too little, he turns it a little downwards; and if the head will not allow any alteration, he gives directions to the smith to bend the sock to the land side, or to the fur-side, upwards or downwards, as is necessary, which serves the same purpose.

It has been observed likewise, that the plowman can give the plough more or less land by the coulter. The coulter is fixed to the beam by wedges; by these wedges he can turn the point of it either to the land or from it as he pleases; or he can turn the fore edge of it a little towards the land, or towards the furrow. The turning of the point or fore edge of the coulter to the land gives the plough more land, and the turning them from the land gives it less.

Care must be taken likewise to place the wrest and mold-board in a manner proper for the design of the plough. The plough that is generally most approved of, and makes the best work, is the one that makes a redd furr below, and sets the furr taken off just upon its edge; for, by making a redd fur below, the whole land is clean plowed, and by setting the fur just on its edge, it is left opener, and the harrows make greater impression than if it is turned upon its back. To make

the plough do this on light land, that falls in pieces in turning, the wreſt muſt be ſet low and wide; but in ſtiff land that goes over with whole fur, if the wreſt is ſet in this manner, the plough will be heavy to draw, and the fur taken off in danger of falling back: for this kind of land therefore the wreſt ſhould be ſet a little higher and narrower.

In gathering ſteep ridges, it is neceſſary that the mold board be caſt out very much above, or the wreſt very high ſet; for without the one or the other of theſe, the plough will not be able to turn the fur to the brae. Theſe are neceſſary likewiſe, when it is intended that the fur ſhall not be ſet on its edge, but turned upon its back, as is ſometimes found proper. In every caſe, care muſt be taken that the mold-board be caſt ſ far outwards above, as to turn the furrow ſufficiently; for if the fore part of the wreſt makes the fur well redd below, and the mold board does not caſt it well out above, having no foundation to ſtand upon, it will fall back again behind the plough.

If the farmer attends to theſe things, he will be able to diſcover where the error lies, if the plough does not pleaſe him in going, and to give directions to his wright how to rectify it. By frequent trial he will alſo find out the exact proportions of the different parts of the plough, and will be able to give directions how to make one to go in what manner he pleaſes.

ART

ARTICLE XLII.

Of the choice of Horſes and Mares for breeding—Profits of breeding Horſes—Conſtruction of Stables.

[In a letter to the Publiſher.]

YOU have already got the marks of a good bull [p 86.] from one of your correſpondents, in order to improve the breed of the horned cattle. I think the improvement of the breed of horſes is no leſs neceſſary and worthy the attention of farmers: as they are ſuch an uſeful animal, and anſwer for ſo many different branches of buſineſs that cannot be done without them. But as the marks and properties of horſes have been ſo much deſcribed by farriers and others, I ſhall paſs over theſe with only this remark, that good eyes and a ſtrong back and barrel, and going well on their legs, are the principal things to be depended on for any kind of buſineſs.

Whatever kind of horſes the farmer wants to breed, let him chuſe both his horſes and mares of the kind he wants; let them be both of a ſimilar make and colour; and then he will ſeldom be diſappointed of his breed, whether for the cart or plough, ſaddle or machine: but to breed out of heavy mares and a galloping horſe ſeldom turns out to good account; as they are commonly both ſmall and croſs made. If the farmer has a tolerable paſture he may ſell his young breed, at three or four years old, at an average, at fourteen or fifteen pounds, ſay, *L.* 14: 10.

Now let us ſee what profits will ariſe to the farmer from breeding.

The

The produce ſuppoſed,		14	10 0
Firſt, I ſhall allow 10*s.* 6*d.* for a leap of a horſe, or 1*l.* 1*s.* for a running foal, that is, allowing two mares to get the horſe at a run, for one foal produced		1	1 0
As the farmer may get ſome work of the mare, when he is throng, without ſpoiling either mare or foal, I think, the graſs for the mare and foal the firſt ſummer will be ſufficiently charged at		1	10 0
I allow to the foal for the firſt winter, two bolls and a half of oats at 12*s.* per boll		1	10 0
And for ſtraw and foggage		0	10 0
Thus at one year old the foal coſts	*L.*	4	11 0
For the ſecond ſummer's graſs		1	10 0
For winter meat, no oats allowed		0	10 0
At two years old he coſts	*L.*	6	11 0
For the third ſummer's graſs		1	14 0
For winter meat		0	10 0
At three years old he coſts	*L.*	8	15 0
For the fourth ſummer's graſs		1	15 0
And if it is kept longer it will work for its meat			
So the whole expence comes to	*L.*	10	10 0
And there remains of clear profit	*L.*	4	00 0

Perhaps it may be thought I have allowed too little for the laſt two years winter meat; but the reaſon is, I allow no corn; and if they have plenty of ſhelter, they can run out all winter, except in ſnow, when they ſhould be admitted to a ſhade or foddering yard or cloſe, and get ſtraw with the other cattle: and this at the ſame time will contribute to make them very hardy. The whole of theſe calculations will indeed be

low

low upon fine rich paſtures; but then the foals will thrive better, and ſell dearer in proportion.

As the farmer can never propoſe to keep either his work or breeding mares properly without good and convenient ſtables, I ſhall give you my opinion in anſwer to that part of your firſt leading queſtion on cattle, [N° I. p. 31.]

The plan I propoſe for building a ſtable is, that it ſhould be twenty-four feet in length, and eighteen feet in breadth within the walls: the horſes heads to ſtand toward the ends; and each end ſhould be put into four diviſions: by this means the ſtable holds eight horſes, and each horſe hath four feet and a half in breadth: Now, if the horſes ſhould ſtand to the ſide walls, it would require thirty-ſix feet in length to hold the ſame number of horſes; and all that could be ſpared of the breadth would not near balance the length. That the horſes may breathe a free and wholeſome air, the ſtables ſhould be pretty high in the walls, and an air-hole or window in the gavel of the ſtable in each end behind the racks, which will carry off the breath of the horſes, and the ſteam that comes from their bodies when warm, and thereby prevent ſpoiling the fodder in the racks; for when the horſes are thronged in low or lofted ſtables, their breath makes the fodder diſagreeable to them, as well as unwholeſome, and they are apt to catch cold when they go out of theſe warm ſtables to the cold air. There are many advantages attend horſes ſtanding ſingle, eſpecially mares with foal, as it prevents them from kicking and hurting other: they are not ſo ready to ſwallow down their corn without chewing it, and thereby they get more nouriſhment from it; for when horſes ſtand together, they ſtrive who ſhall get moſt of the corn: young horſes, or horſes new bought in, are commonly beat back from their meat by the others; and it is a common obſervation, that the firſt year that horſes come to a ſtable they ſeldom uphold well; what other reaſon can be given but their being beat back by their neighbours. Some horſes that appear in beſt liking when they ſtand beſide

four

four or five others, by eating faſter, or driving the others back may be no more likely than the reſt when they have to depend wholly on their own corn; but when the farmer has got his horſes to ſtand ſingle, he can feed them all as he think proper.

Sir, if you think this worthy a place in your Scots Farmer you may give it one, if not you may light your pipe with it. Mean time, I am, SIR,

Eaſt-Lothian, Yours, &c.
12th March, 1773. PHILIP

ARTICLE XLIII.

Of deſtroying Quickening Graſs and Whins.

[In a letter to the Publiſher.]

I do not take your publication to be for critciſm or diſputes that would certainly deſtroy the end for which it was intended, which you profeſs is for the inſtruction of plain country men, and the advancement of agriculture; but if an error ſhould appear contrary to experience, which might prove hurtful to the public, by leading the farmer into a wrong courſe it would be wrong to let it paſs unnoticed *. This, I appre hend

* The caution with which our worthy correſpondent introduces his letter is very commendable; and will, we hope, be an example to our correſpondents in expreſſing any difference of opinion with one another. The rock on which the Editors of the Museum Ruſticum ſplit, [No. I. p. 9.] ſhall always be a beacon to us; and will prevent us from admitting into our collection any thing that ſavours of captiouſneſs or ill-breeding. Difference of opinion cannot be helped; and men will be apt to draw different concluſions from the ſame experiments: If theſe are modeſtly propoſed, they will meet with a candid diſcuſſion, and the truth may thereby be diſcovered, which the heat of contraverſy, or the humour of ſelf-conceit, will moſt likely prevent.

end, is the caſe with a paſſage in the excerpt you have taken rom Mr Dickſon's book of agriculture, [No III. p. 101.] where he ſays, you may clean any land of quickening graſs y only letting it lye ſeven years in graſs, but four or five ears is ſufficient for moſt ſoils. Now, Sir, I have known round fourteen years in graſs, and when ploughed up exceſ- ve thick of quickening graſs. I own that the roots may grow ome ſmaller, but few of them will die away, and then the arth is no ſooner looſed about them, and expoſed to the air, han they grow as faſt as ever; I would be far from adviſ- g any perſon to truſt to that way of cleaning their ground; ut I would recommend firſt to fallow the ground well, and hen lay it down with plenty of graſs ſeeds, after which you ill be ſure to take it up clean.

In another paſſage, Mr Dickſon ſays, (p. 108.) It is certain hat whin-ſeed will not vegetate while the land is in tillage; e owns, indeed, that it is hard to give a reaſon for it; but the hing, he ſays, is certain, that the whin-ſeed will not vegetate nleſs the ſeed lye a long time undiſturbed; and ſooner than wo years, the whins will not appear. Now, Sir, I have dif- erent fields at preſent under culture, and every time I plough- d and harrowed them, I had a freſh crop of whins; and laſt arveſt, among the firſt crop of corn after fallow, I had the hins from four inches to a foot in length, almoſt as thick s the corn. Mr Dickſon's method of pulling the whins is cer- inly very effectual, but where the whins have been old, and rge quantities of ſeed in the ground, it may prove both tedious nd expenſive, unleſs the ground be kept a long time in tillage.

And now, Sir, I ſhall give you my opinion, which way think beſt to hinder the whins from infeſting the ground. or the future, after you have your whins rooted out, allow your ground, and every time you plough and harrow it, ou will have a young crop of whins; but if you can lime it, at will raiſe a fermentation, and open the pores of the ground, nd haſten the vegetation of the whins; then take but two crops

of

of corn that you may not waſte your lime; ſow it in with graſs-ſeeds, and the ſeeds I would recommend for that kind of land is rye-graſs, and what they call rib-graſs, hemp-graſs, or narrow leaved plaintain: but it will ſtill be the better for red and white clover; for the more kinds of good ſeeds the better. Take one crop of hay, and two or three years paſture; and then plow it again before the whins carry ſeed or be troubleſome to plow; take other two crops of corn; and then fallow it again and dung it; which will help to make the ſeeds of the whins to vegetate; take other two crops of corn, and then I think it is reaſonable to expect they will not be very troubleſome: but ſhould ſome few riſe, it will be eaſy to keep them down by pulling them, or cutting them below the ſurface with a hoe.

If any of your correſpondents can put me on a better method of deſtroying whins, as I poſſeſs a good deal of that kind of land, they will very much oblige,

Eaſt Lothian, Yours and their
March, 11th, 1773. Moſt humble ſervant,
W. B.

ARTICLE XLIV.

Of the proper management of the Arable part of Sheep or Store Farms.

[In a letter to the Publiſher.]

IN my two former letters, [p. 182. and p. 242.] I laid before you ſome obſervations how a farm formerly neglected, at leaſt the management of it but ill conducted, might, in my opinion, be managed with more advantage to its poſſeſſor, and thence more profitable to the public; and likewiſe, I made ſome obſervations upon the utility of incloſing. I ſhall, in this, lay before you a ſcheme for the management of a ſtore

ſhee

Sheep farm, which, if any chuſes to adopt it, will, in my opinion, contribute perhaps to their advantage. I ſhall then, in the firſt place, give a ſhort deſcription of their management, as it is generally practiſed among them, as far as the circle of my acquaintance reaches: And, in the next place, I ſhall give my opinion how their farms ſhould be managed, in order to produce greater profit, and at the ſame time with leſs expence. I ſhall begin then with that part of their farm they have in tillage, as there is few or none of the ſtore-farms I know, but has leſs or more of them employed that way: Their preſent method of management is generally in this way. It is divided into, infield or mucked land as they call it; and outfield or fecland: Their infield is generally divided into two breaks, although compoſed of different fields, and that they ſow alternately with oats and bear or barley, generally dunging to the bear, ſeldom peaſe, and almoſt never fallow; ſo in conſequence of which management, their infield is become very rich, and at the ſame time become no leſs dirty and foul, ſo that they have generally along with their crop of bear, large quantities of what they call rumms or crops, which chokes the corn, and greatly hurts it. Their method of managing their outfield is generally in this way; they take in ſo much of it yearly as they can dung with their ſheep and cattle by folds, and from this they generally take four or five crops of oats together, and leaves it out for graſs again: another part of their outfield they take in this way; they plow it in winter or ſpring, and lets it remain ſo through the ſummer, and then in autumn they plow it again the ſame way with the firſt to keep it from wither furring as they call it, and from this they generally take three crops of oats, and lay it out again in ley. Their crops from the ground as above managed are generally ſo bad, that they will not defray the expence of ſeed and labour, and when aſked how they come to perſevere in ſo unprofitable a ſcheme of farming, their anſwer generally is, that it is to prevent their ground from going to

heath, as it generally does when ſuffered to lye long untilled. I have now given a ſpecimen of the management generally practiſed in the moor-lands or highland parts of the country I am acquainted with; but I muſt likewiſe tell you, that there are many exceptions to be found to the above method of managing, and ſeveral farmers to be found who are making great progreſs in improving their farms, both in the corn and ſtore way. But, with ſubmiſſion to the above gentlemen, who do not come under the deſcription of the farming that is generally practiſed among them, and are exceptions, I ſhall lay before the public my opinion of managing a farm, lying in the ſituation above deſcribed, in another way leſs expenſive and I hope ſhall appear, upon fair trial, to be more profitable and convenient in ſeveral reſpects. I adviſe then to begin with the infield, and take that part of it which was laſt under oats, and intended for bear this year, to undergo a thorough ſummer fallow, to have at leaſt five or ſix plowings beſtowed upon it, and immediately after each plowing a ſufficient harrowing, except the firſt, which is ſuppoſed to have been done in winter; and the laſt, which is deſigned for the ſeed-furrow, and is to lye through the winter in that ſituation. The reaſons for harrowing ſo often is, to reduce the ſoil to a fine mould, and likewiſe to retain its moiſture, ſo that it may make all the ſeeds of the different weeds it is ſo much infeſted with vegetate the better and ſooner; then I adviſe to ſow it with oats next ſpring, one boll is ſufficient for an acre, and along with them graſs-ſeeds, the moſt proper kind of which for that part of the country, I think, will be, firſt rye-graſs which may be ſown three firlots upon each acre; next plantane or rib-graſs, of which about ſix or eight pounds per acre to be mixed and ſown along with the rye-graſs and clover; you may for an experiment try a few pounds of red and white clover, as I have no doubt but they will ſucceed if proper care is taken of them the firſt winter; then it may be reaſonably expected, that a good crop of hay will follow next year

which

which is to be taken care of for the purpoſes hereafter to be mentioned. The other diviſion of the infield to be managed in the above manner next year; then I adviſe to paſture the whole for a certain number of years, and if it is a farm adapted for corn, it may then ſucceſsfully be broken up, and three crops taken from it; the firſt oats; the next turnip or cabbage or red curled kail, or part of it may be potatoes or flax as judgment upon experience ſhall direct; then the third to be oats with graſs-ſeeds as above directed. I return now to the outfield or ſecond diviſion; and I would recommend the following method of management to be beſtowed upon it: which is, that after they have taken three crops from their folded ground, or two from their fallowed, to fallow again; and the method I laid down in my firſt letter, (No. IV. p. 182.) I refer to for the management of this diviſion, with reſpect to fallowing, dunging, liming, and plowing; but then I adviſe, inſtead of Lincoln barley, to ſow oats and graſs-ſeeds as above directed, and to take a crop of hay from it the firſt year; then paſture, until the whole arable is laid in graſs in the above manner: then it may be broken up and croped in the ſame way as directed for the infield, or continued in graſs according as the poſſeſſor ſhall find it to be moſt profitable and convenient; which chiefly depends upon the ſituation of the farm, whether it is moſt adapted for corn or graſs, as there are many highland or ſtore farms I know, that have many fine fields in them for corn if properly improven; on the other hand, I know a great many likewiſe that deal conſiderably in corn, which is, in reality, a great loſs to them, for by reaſon of their cold and high ſituation, altho' their crop ſhould prove very luxurious, it ſeldom or never comes to full maturity; and in that caſe, conſidering the great expence attending a corn crop, it would be much more profitable to want it, and to have the whole in graſs after it has been laid down in the order above deſcribed. As to the objection of its going into heath again, there would, in my opinion, be very little to fear from that quarter,

heath, as it generally does when ſuffered to lye long untilled. I have now given a ſpecimen of the management generally practiſed in the moor-lands or highland parts of the country I am acquainted with; but I muſt likewiſe tell you, that there are many exceptions to be found to the above method of managing, and ſeveral farmers to be found who are making great progreſs in improving their farms, both in the corn and ſtore way. But, with ſubmiſſion to the above gentlemen, who do not come under the deſcription of the farming that is generally practiſed among them, and are exceptions, I ſhall lay before the public my opinion of managing a farm, lying in the ſituation above deſcribed, in another way leſs expenſive and I hope ſhall appear, upon fair trial, to be more profitable and convenient in ſeveral reſpects. I adviſe then to begin with the infield, and take that part of it which was laſt under oats, and intended for bear this year, to undergo a thorough ſummer fallow, to have at leaſt five or ſix plowings beſtowed upon it, and immediately after each plowing a ſufficient harrowing, except the firſt, which is ſuppoſed to have been done in winter; and the laſt, which is deſigned for the ſeed-furrow, and is to lye through the winter in that ſituation. The reaſons for harrowing ſo often is, to reduce the ſoil to a fine mould, and likewiſe to retain its moiſture, ſo that it may make all the ſeeds of the different weeds it is ſo much infeſted with vegetate the better and ſooner; then I adviſe to ſow it with oats next ſpring, one boll is ſufficient for an acre, and along with them graſs-ſeeds, the moſt proper kind of which for that part of the country, I think, will be, firſt rye-graſs which may be ſown three firlots upon each acre; next plantane or rib-graſs, of which about ſix or eight pounds per acre to be mixed and ſown along with the rye-graſs and clover; you may for an experiment try a few pounds of red and white clover, as I have no doubt but they will ſucceed if proper care is taken of them the firſt winter; then it may be reaſonably expected, that a good crop of hay will follow next year which

which is to be taken care of for the purpoſes hereafter to be mentioned. The other diviſion of the infield to be managed in the above manner next year; then I adviſe to paſture the whole for a certain number of years, and if it is a farm adapted for corn, it may then ſucceſsfully be broken up, and three crops taken from it; the firſt oats; the next turnip or cabbage or red curled kail, or part of it may be potatoes or flax as judgment upon experience ſhall direct; then the third to be oats with graſs-ſeeds as above directed. I return now to the outfield or ſecond diviſion; and I would recommend the following method of management to be beſtowed upon it: which is, that after they have taken three crops from their folded ground, or two from their fallowed, to fallow again; and the method I laid down in my firſt letter, (No. IV. p. 182.) I refer to for the management of this diviſion, with reſpect to fallowing, dunging, liming, and plowing; but then I adviſe, inſtead of Lincoln barley, to ſow oats and graſs-ſeeds as above directed, and to take a crop of hay from it the firſt year; then paſture, until the whole arable is laid in graſs in the above manner: then it may be broken up and croped in the ſame way as directed for the infield, or continued in graſs according as the poſſeſſor ſhall find it to be moſt profitable and convenient; which chiefly depends upon the ſituation of the farm, whether it is moſt adapted for corn or graſs, as there are many highland or ſtore farms I know, that have many fine fields in them for corn if properly improven; on the other hand, I know a great many likewiſe that deal conſiderably in corn, which is, in reality, a great loſs to them, for by reaſon of their cold and high ſituation, altho' their crop ſhould prove very luxurious, it ſeldom or never comes to full maturity; and in that caſe, conſidering the great expence attending a corn crop, it would be much more profitable to want it, and to have the whole in graſs after it has been laid down in the order above deſcribed. As to the objection of its going into heath again, there would, in my opinion, be very little to fear from that quarter,

quarter, conſidering the good order it has been laid down in; but if, in proceſs of time, it ſhould make its appearance upon any part of it, it is but reſuming the above method effectually to deſtroy it. I ſhall mention another method of keeping down heath upon ground not proper for tillage, and that is, by manuring it upon the ſwaird with dung, peat-aſhes, or a compoſt of lime and rich earth, and there are few or none of the ſtore farms I know, but are poſſeſſed of either moſs or muir; ſo that they have it in their power to procure from theſe materials plenty of fine manure for the above purpoſe; and ſince that is the caſe, I would recommend it to a great many ſtore maſters to diſmiſs their plough, unleſs they are poſſeſſed of at leaſt forty or fifty acres of arable, that they can depend upon to produce a tolerable crop, of at leaſt five bolls per acre at an average. The keeping of a plough is a very expenſive article; at the loweſt calculation it will coſt fifty pounds per annum, and it occaſions likewiſe to have one ſervant more at leaſt for ſix months for threſhing the corn, which will cost five pounds more; in all fifty five pounds ſterling. This being the caſe, I am afraid ſome ſtoremaſters adopt the old proverb, That if they count all coſt they will never put plough in the ground. That indeed is a fooliſh opinion, and carries its own refutation along with it. I would therefore adviſe every ſtoremaſter, to be at due pains to calculate how much he gains or loſes by corn crops, eſpecially as he has it in his power to manage his farm in a different way, without one ſhilling of additional expence, by laying and keeping it in graſs.

I ſhould now enter upon the other part of the ſubject; namely, to offer my opinion with reſpect to the management of the ſheep or ſtore part: But as this letter is already drawn to a great length, I ſhall conclude at preſent, and ſhall leave what I have to ſay to be the ſubject of another letter. I am,

SIR,

Your humble ſervant,

A. T.

March, 13th, 1773.

ART

ARTICLE XLV.

Of the Sturdy and Sickneſs in Sheep: Continued from No. V. *p.* 240.

[In a letter to the Publiſher.]

ANOTHER diſeaſe which I mentioned prevalent among ſheep is, the Sturdy; the ſymptoms of which are, that the animal when infected becomes ſolitary, delights in the murmuring noiſe of waters, and runs frequently round. This diſtemper is very like that, which is commonly known by the name of water in the head amongſt reaſonable animals. A ſmall bag full of a limpid watery ſubſtance is collected in the hinder part of the head betwixt the ears of the ſheep: When this is extracted by a ſkilful hand, and the bag taken out unbroken, the creature recovers its former ſtate of health: But the ſhepherds in general are ſuch wretched bunglers, that, for the moſt part, the old proverb with great juſtice may be applied, That the cure is worſe than the diſeaſe. This diſtemper is ſuperſtitiouſly conſidered by many, as foreboding proſperity to the flock; and as it is not ſo fatal as the diſtempers already named, they fooliſhly give themſelves little or no concern about it. It is probably however moſt eaſily cured of all, were it properly conſidered. It moſt abounds in windy ſeaſons, and, as far as I know, in the ſummer months.

The next diſeaſe which deſerves great attention is, that which they call the Sickneſs, doubtleſs by way of eminence, becauſe it is the moſt deadly of all. It is a kind of malignant inflammatory fever, infectious I imagine, becauſe it ſweeps away great numbers of the flocks. It is occaſioned, I conjecture, by a plethora or fullneſs, and might be cured by ſeaſonable bleeding, purging, and other neceſſary evacuations: but unluckily there is not a ſhepherd among a hundred that knows how, when, or where to bleed a ſheep. This diſeaſe rages in the

the latter end of harveſt and in the beginning of winter, and abates when the ſheep become lean in the ſpring. After the animal has faſted long, and eats greedily, it often falls into this diſeaſe. Perhaps it would be neceſſary to hinder ſheep from eating at pleaſure in ſome particular ſeaſons; as we hinder cows from ſurfeiting themſelves with clover, which they would infallibly do were they not prevented. When rich graſs has been long unpaſtured, young ſheep eſpecially are apt to over-eat themſelves. This might be prevented by timeouſly removing them from a better to a worſe paſture, when they would not be expoſed to the ſame temptation. If this diſeaſe were accurately traced and inveſtigated, I am of opinion it would be found, that ſheep as well as men are liable to various kinds of fevers, putrid, inflammatory, and intermitting. That theſe diſtempers are not ſo frequent, and attended with ſuch variety of ſymptoms, among the former as the latter ſpecies, is, as I have already hinted, that the one is temperate, the other often not intemperate. It is very unlucky however that this malady cuts off commonly the young, the ſtrong, and the healthy; for the old, the feeble, and the infirm, whether ewes or wedders, are very little ſubject to it.

PAN *curat ovïs, ovumque magiſtros.*

I am, SIR,
Your moſt humble ſervant
P. P.

Edinburgh,
March 30th, 1773.

ART

ARTICLE XLIV.

On the Culture of Potatoes.

[In a Letter to the Publiſher.]

WHILE many pay due regard to every improvement in Agriculture, there are multitudes who reject every eme propoſed for their benefit, and, for this reaſon, becauſe appears in print. In a converſation where the SCOTS RMER was mentioned, a farmer of no ſmall note aſked his ighbour, who is a ſubſcriber to the publication, if he believ- what was there inſerted, and would try any thing therein commended : And being anſwered in the affirmative, pitied neighbour for his folly.

An attempt to reform an error in practice is often very worthily treated, either from the pride or obſtinacy of thoſe o ſcorn to be taught by others, or think themſelves too owing to need any information : The fear therefore of being ated with unjuſt and ſupercilious criticiſm, has prevented, every ſcience, many a modeſt and ingenious man from com- nicating his remarks to the publick. The diſcoveries, ich genius and aſſiduity have made, have not always been ſidered and received as their importance deſerved : Many ſervations have been rejected as trivial and worthy of no re- d, which, if carefully attended to and weighed, might have ved of great value : Nay, farther, many things ſtrange and adoxical at firſt ſight, might, upon due conſideration, have n allowed and been univerſally received as high improve- nts. Let me intreat therefore every farmer to believe, he is above inſtruction ; and not to condemn a ſcheme of im- ement, becauſe recommended from the preſs. The moſt wing may learn from the ignorant. In hopes of being of her uſe, I have ſent you the following remarks; and if I not fully underſtood in this, and my paper in your No. V. 46. upon the bean culture, and any Farmer wants more par-

particular information, you are at full liberty to give my di-
rection, and I ſhall moſt readily communicate whatever is in
my power for their benefit.

Potatoes are a crop of the moſt valuable kind to the farmer,
and, if rightly managed, productive of the higheſt advanta-
ges: No food more wholeſome, when raiſed on their proper
ſoils. It is well known, multitudes in Ireland have little elſe
to eat, and enjoy on that fare uninterrupted health.

I have tried the raiſing them in various ways; and without
taking up your paper with an account of my experiments,
ſhall give you the reſult of them, as tending either to increaſe
the crop, or in preparing the land for ſucceeding ones of
grain, &c.

Potatoes will thrive on every ſoil but wet clays; the beſt for
them, and all other crops, is a deep, light, rich, black earth;
though they will afford large returns upon gravels alſo: What-
ever the ſoil is, it ſhould be plowed before winter, and again
in March, then harrowed fine; after which, if the ſoil is of
the clay kind, it ſhould be covered with rank dung, but if a
light ſoil, with dung well rotted, then to have the laſt plow-
ing in the beginning of April, and again harrowed. Your
ſeed potatoes are to be cut with one ſtrong eye to each ſet, or
two eyes if they are weak. You muſt have a line marked at
every foot diſtance with bits of red and blue worſted alter-
nately; the line muſt be placed at the diſtance of two feet,
and, if poſſible, north and ſouth, that the rays of the ſun may
have free acceſs up and down the rows. A man with a ſpade
digs out a little earth oppoſite to every piece of worſted, and
not above three inches deep, as I have ever found that deep
planting is a great prejudice to increaſing the produce; this
thrown away; into each of theſe little pits a woman drops a
plant, the man begins the ſame way at the other line, but the
earth he takes out of the ſecond pits is put into the firſt one
to cover the ſets; in this manner the whole field is to be
planted, and with more expedition and leſs expence than by

be imagined; the field is then lightly harrowed; ſo ſoon as the weeds appear, the land is hoed over which is done by a broad paring iron with a long handle, which a man puſhes before him: When the potatoes are up, they muſt conſtantly be kept free from weeds, and the intervals well hand-hoed; and when they are a little advanced, a one horſe plough is to go down each allay, and lay up the earth to the plants, which muſt not be taken away again; the few remaining weeds that may appear are to be pulled out by hand; the potatoes will ſoon extend to each other and ſuffer no more to grow; when they are fully ripe, I dig them up with long broad three pronged forks, which anſwer much better than ſpades, as eaſier to work with, not cutting the potatoes, and has this great advantage of ſhaking out every piece of remaining graſs-roots. To each digger I allow two gatherers; the land is immediately harrowed, more potatoes will then be found immediately after it is plowed for the winter, and all the crop taken clean up. In this way, I have raiſed a much greater crop than by any other, and my land left in the fineſt order.

I uſed to plant them by the plough in different ways, but all theſe I have entirely laid aſide. I uſed alſo to take them up by the plough, but the other method of digging with tropes or three pronged forks coſt leſs expence, and takes out the remaining graſs-roots, if the weather is dry, and you cauſe your diggers to be careful in ſhaking the earth as they take it up with a plough and two horſes. I uſed to take up fourteen bolls a-day; to it I had twelve gatherers, four of which were men, to turn over the earth with forks as turned up, and eight women to gather; the men at nine-pence is three ſhillings, the women at four-pence each two and eight pence; the plough I reckon five ſhillings; which makes in all ten and eight-pence. In the other way, I have known one man dig five bolls, with two gatherers, but in the general three bolls, reckoning the man ten-pence, and the two women eight-pence, makes only ſix-pence *per* boll, cheaper by much than by the plough, and the benefit to the land by digging much greater.

By this culture a large crop will never be wanting, from forty to ſixty bolls; but without due attention nothing can be expected. The God of all our mercies hath ſaid, the labours of the diligent ſhall be bleſſed. The clouds fraught with the richeſt food will ſtop over his field, and gently drill their balmy drops, while the Sun, with genial warmth, will ripen all, and the year, in due time, be crowned with *Good.*

I am yours, &c

RUSTICUS.

ARTICLE XLVII.

To the PUBLISHER of the SCOTS FARMER.

The Commiſſioners for Annexed Eſtates having publiſhed and diſperſed the two following papers amongſt the tenants of the public, towards their and their neighbours relief from the diſtreſſes they have been and are now under; I here ſend them to you, in caſe you think the publication of them in the SCOTS FARMER can be of uſe to others. Even their example as to ſuch judicious matters merits regard. I am, yours, &c.

PRO PATRIA.

Premiums propoſed to be given by the Commiſſioners of Annexed Eſtates. To which are annexed, Directions for raiſing and preſerving Potatoes, intended for the uſe of the Pariſhes or Diſtricts in which the ſaid Commiſſioners propoſe to give premiums. By a Gentleman, a member of the Board, experienced in raiſing that valuable root.

Premiums propoſed to be given by the Commiſſioners of Annexed Eſtates.

THE Commiſſioners obſerving with concern, that there is almoſt every year a ſcarcity of meal and other proviſions in the wilder parts of the Highlands, and that the want

wants are more felt and complained of in the ſummer-months than in any other ſeaſon of the year; and having for ſome time thought, that the poorer ſort of people might in a conſiderable degree be relieved of this diſtreſs, by raiſing potatoes much earlier, and by keeping them longer than they do at preſent; propoſe giving the following premiums in the five diſtricts after mentioned.

1. The pariſhes of Callandar, Balquhidder, and Comrie.
2. In that part of Perthſhire called *Rannoch*.
3. The pariſh of Laggan.
4. The pariſh of Kilmalie.
5. The pariſh of Lochbroom.

Firſt Claſs of premiums.

To the farmer or cottar who ſhall in the year 1773 raiſe, and ſhow to the King's factor reſiding in any of the above diſtricts, or to the miniſter of the pariſh in which he lives, the firſt ſtone weight of early potatoes, fit for eating, the ſum of	L.	2	2 0
For the ſecond quantity of early potatoes, of ſame weight		1	11 6
For the third quantity of early potatoes, of ſame weight		1	1 0

Certificates of the earlieſt date by the factor or miniſter of the pariſh, entitle the gainers to the premiums.

Second Claſs of Premiums.

To the farmer or cottar who ſhall ſhow, in the year 1774, to the King's factor reſiding in any of the above diſtricts, or to the miniſter of the pariſh in which he lives, the parcel of the longeſt kept and well preſerved potatoes of the growth of the preceding year, and not under one ſtone weight, the ſum of	L.	1	1 0
For the ſecond longeſt-kept and well preſerved potatoes, of the ſame weight		0	15 0
For the third longeſt-kept and well-preſerved potatoes, of the ſame weight		0	10 0

Nota, The ſtone here meant is that commonly uſed in weighing meal.

No

No perſon to be entitled to this laſt claſs of premiums, unleſs the production of the potatoes is on, or poſterior to, the 1ſt day of June.

All farmers or cottars living within any of the above diſtricts or pariſhes, to be entitled to all the premiums above mentioned, whether they are or are not poſſeſſors of land belonging to the crown. But it is to be underſtood, that the ſame perſon ſhall not be entitled to the firſt or greateſt premium in any of the above two claſſes for more than once.

Theſe premiums to be continued by the Board for three years certain.

DIRECTIONS for raſing and preſerving Potatoes, intended for the uſe of the pariſhes or diſtricts in which the Commiſſioners of Annexed Eſtates propoſe to give premiums.

THERE is a great variety of potatoes raiſed; but the following kinds are moſt eſteemed.

The ſmall early round white potatoe, which is brought from Lancaſhire, and ripens much ſooner than any other.

The large white round potatoe, which is both prolific and keeps long.

The rough-ſkinned white potatoe.

The white kidney potatoe.

The red potatoe, the ſhaws or hulm of which carry no flowers.

The red potatoe, which reſembles in ſhape a bullock's kidneys.

The cluſtering potatoe, which grows in lumps and irregular figures, lately brought into this country.

Theſe two laſt kinds, though extremely prolific, are fitter for hogs or cattle, than the tables of thoſe people who prefer delicacy of taſte to quantity.

All

All kinds of ſoils will produce potatoes, but the light ſandy nd gravelly ſoils generally anſwer beſt.

Boggy or ſwampy places, if properly drained, dug, and reſſed, will make great returns. And indeed no ſoil will roduce a larger quantity of good ſound healthy potatoes, an black moſs or peat, when found naturally mixed with rth or mould; which is commonly the caſe in ſides of oſſes lying on ſloping ground, or on level grounds, where ey have been flooded by brooks or rivers.

Dry ſandy grounds lying to the ſouth, and covered from the rth and eaſt winds, will produce the earlieſt potatoes. But is proper to obſerve in this place, that the ſhaws or hulm potatoes planted in the low grounds near rivers, though e ſituation is dry and otherwiſe favourable, are found to more ſubject to be hurt by the early froſts in the months Auguſt and September, than thoſe planted in higher and ore expoſed places.

If a very early crop is the object, potatoes may be planted ith ſafety through the whole winter-months, the weather ing ſoft and mild at the time. But it will be proper, in is caſe, to cover, immediately after planting, the ſurface the beds with litter, ſtraw, or brackens, to keep out the oſt. This cover may be taken off in the ſpring, when ere is no more danger of froſt, and uſed as manure for er potatoes. But it will be found in common ſeaſons, at what is planted any time in the month of February, will me to maturity nearly as ſoon as thoſe planted ſome weeks rlier, and run leſs chance of being froſted, and eaten by ice, &c.

It may be held as a general rule, That the ſooner potatoes planted after the froſts are gone, the crop will be the ore certain.

If potatoes are large, they ſhould be cut into as many ſets there are good ſtrong eyes; but if ſmall, they may be cut only

only into two, or planted whole, though very ſmall ſeed i
never to be preferred but in caſes of neceſſity.

There is a conſiderable variety in the different ways o
planting; but I ſhall only mention the following: viz.

In lazy beds, which was the firſt method introduced fro
Ireland. The name ſhews that it was invented to ſave la
bour, and adopted by the indolent; though it is well know
to be extremely hurtful in ſhallow ſoils: and I think it ſhoul
never be followed, but in ſome very particular caſes, ſuch a
to double the ſoil on a very rocky place, and to thicken an
prepare the ſoil of a border for a hedge round a garden, o
field.

Though an enemy to lazy beds, I approve much of th
Lancaſhire method of working with the ſpade; there bein
no other way that will give ſo large a return on the ſam
ſurface of ground, and bring the land into better order fo
ſucceeding crops.

The Lancaſhire method is, to open a trench at the low
ſide of a field about ſix inches deep, then to bed that wi
dung in ſuch proportion as they think reaſonable, or can ea
ly procure; then cover up the dung with earth, and proce
in repeating the ſame operation, ſo as the dung may lie ov
the whole ground about ſix inches under the ſurface. B
as they think it of great importance to keep the ſoil as lig
as poſſible above the dung, they cut the earth into thin lo
ſlices, by ſlanting the ſpade, and working with a longer ſha
than is commonly uſed in this country. The dung intend
to be ſpread in the trench, is laid in heaps behind the wo
men, of ſuch a ſize as they think ſufficient for the purpo
and ſpread or ſcattered in the trench with a dung fork
gripe. Spreading the dung upon the ſurface of the und
ground, would prevent the ſpade from cutting clean and c

As this work may be executed in open weather at a
time through the winter, it, in that way, gives opportun
to the potatoe-planter to prepare a much greater quantity
gro

round than could otherwiſe be done by the ſpade; for the bbling in the ſets of potatoes in the ſpring is very ſoon erformed, if the foot-dibble is uſed, and a boy or girl mployed to drop in the ſeed. And it ſhould be remembred, at the hole made by the dibble ſhould be ſunk juſt ſo deep to cauſe the potatoe ſet lie directly upon the level with the ung

Ground either in graſs or tillage may be dreſſed in this anner; and from the nature of the operation, even the norant will at once be ſenſible, that it is the moſt ady, cheap, and effectual method of bringing in waſte ound lying in a ſtate of nature, where a plough cannot, r rocks or ſteepneſs, be employed.

But it will be proper to obſerve, that if potatoes are to be anted in very ſteep ground, the trench ſhould be firſt open- on the upper ſide of the field, and all the earth thrown onſtantly up, to prevent that part of the ſurface being laid are of ſoil, which, without this neceſſary precaution, will rtainly happen in time.

The diſtance of the ſets or plants from each other ſhould be out nine or ten inches each way; for, by experience, that iſtance is found to produce the weightieſt crop in general; hough ſingle roots cannot be expected of ſo large a ſize, as hen planted at a greater diſtance.

When the potatoes are planted, the ground muſt be raked harrowed, to cover the ſeed. But as the roots appear evi- ently to thrive beſt, when the earth lies open and light, I ould adviſe treading down the new-planted ground as little poſſible. Few weeds will riſe after working in this manner; ut if they ſhould, they muſt be cut out with a ſmall hoe, or ulled by the hand.

Where fields are extenſive, and convenient for tillage, the lough is certainly the more adviſeable method of raiſing large uantities. But as the ground is ſeldom prepared in a pro- er manner, repeated plowings and harrowings, and picking

out

out all large ſtones and graſs-roots, are ſtrongly to be incul-
cated, before dunging, and giving the ſeed-furrow.

Moſt fields would require for this purpoſe at leaſt three or
four plowings, harrowings, and weedings, to make them ſuf-
ficiently open and looſe. For it is to be obſerved, that the
looſer and finer ground is made, when enriched with dung,
the produce will be the greater.

Freſh dung anſwers better for potatoes than any other, and
litter, ſtraw, or brackens, mixed with a little dung, or even
by themſelves, prove an excellent manure for this uſeful root,
and likewiſe ſea-wreck, where it can be had.

If potatoes are to be cleaned by the plough, then they
ſhould be planted in ſtreight ridges, at leaſt two and a half
feet diſtance, or rather three feet. Some improvers, in order
to dreſs their ground more completely, plant the ridges at four
or five feet diſtance, and even ſome at ſix feet.

But, by experience, it has been obſerved, that drills, at even
a leſs diſtance than two feet, have produced a heavier crop of
potatoes than the ſame length of a drill at ſix feet. The ſhaw
or hulm ſhading the ground, and keeping out the drought,
may account for this.

The ſets of potatoes ſhould be planted at twelve inches di-
ſtance in the rows, ſo as to give room for hand-hoeing, and
weeding between them.

If the drills are at a conſiderable diſtance, bedding the fur-
rows, where the potatoes are to be planted, with dung, is all
that can be well expected.

But if the plants are to ſtand very cloſe, it will be better to
dung the whole ground, taking care to cover it well up with
the plough.

No poſitive rule can be given for ploughing, harrowing, or
hoeing, or laying up the earth to the roots after planting. But
the cleaner of weeds and opener the ground is kept, the
greater will be the chance of ſucceſs. The ſame rule will an-
ſwer

wer where the ground is cleaned by the hand-hoe, or other-wiſe.

Potatoes are always eſteemed ripe, and at their full ſize, when the ſhaws fall without froſt, and they part from their ſtrings or ſmall roots.

But if they are wanted ſooner for ſubſiſtence, they may be raiſed long before theſe appearances of maturity, without any conſiderable loſs of quantity; but where neceſſity requires, even ſome part of the quantity muſt be given up.

Every Farmer knows how to raiſe potatoes: but if potatoes are intended to be kept till very late in the enſuing ſeaſon, it is adviſeable, more particularly ſo in dry ſoils and ſituations, to let ſome part of them remain in the ground untouched, till the froſts are over in the ſpring; taking care to cover them up with ſtraw, brackens, ruſhes, or heather, in the month of October, to prevent the baneful effects of violent froſts.

If the curious farmer wants to propagate a variety of kinds, the more certain method is, to ſow the ſmall ſeeds found in the potatoe-apples. This has been frequently practiſed, and never failed to produce the deſired effect. As the proceſs is very ſimple and eaſy, the following directions are ſuppoſed ſufficient: When potatoes are fully ripe, which is known by the falling of the hulm, pick ſome bunches of the largeſt and faireſt apples, and hang them up in a dry place, till the month of April; then break them down, and waſh out the ſeeds with the help of a little cold water; ſow them in drills, at eighteen inches diſtance, in a freſh fine mould in a garden. If the ſeed is good, it will riſe in a ſhort time as thick as creſſes.

But when this is the caſe, it will be neceſſary to thin the plants, ſo that they may ſtand about ſix or ſeven inches diſtance from each other in the row or drill, to give room to the roots and hulm to ſpread. The ſuperfluous plants may be tranſplanted into new ground, where they thrive in general, the weather being favourable, as well as thoſe left in the ſeed-bed. The whole muſt be raiſed in the month of September

or October following, when the greateſt part of the roots will be the ſize of large nuts; ſome as large as walnuts, and a few as big as ſmall eggs. Theſe muſt be kept carefully through winter, and planted the ſucceeding ſpring, when they will produce potatoes of the ordinary ſize, and exhibite a great and unexpected variety.

Of preſerving Potatoes.

Keeping them dry, and preventing the froſt from affecting them, is the chief and eſſential thing to be obſerved in preſerving of potatoes, and therefore may be eaſily attained by attending to the following ſimple hints.

1. Laying them in a cellar, where no froſt can come, or in the end of a barn, (taking care to pack ſome ſtraw or bracken betwixt them and the walls, to prevent the cold or froſt from attacking them on that ſide), and then covering them deep up with ſtraw on all the other ſides: or, if they are not to be ſoon uſed, building a mow of corn above them, taking care that the corn is will winned and dry; for if it heats, it will ſoon ſet the potatoes a-growing, and rot and ſpoil them. It is the practice in Lancaſhire, to lay them up in round heaps in dry places of the fields where they were produced; but to prevent the admiſſion of froſts and rain, they cover them up about two feet deep in every part with earth, and thatch over the top of the heap with ſods, or a little ſtraw; taking care, before they do this, to pick out all thoſe that were ſpoiled before raiſing, or cut in taking them up; by the neglect of which precaution great quantities of potatoes have been many times deſtroyed and loſt. I would adviſe the picking out the very largeſt of the potatoes, and uſing them quickly; for it is frequently obſerved, that theſe overgrown potatoes generally have worms in their hearts, and are more ſubject to ſpoil than thoſe of a middling ſize.

Where

Where dry light ground can be had of a ſufficient depth, burying them in holes cut five or ſix feet deep, and thatched over, to prevent a perpendicular admiſſion of rain, and of ſufficient thickneſs to keep out the froſt, will anſwer the expectations of the induſtrious and careful farmer.

But if potatoes are to be kept very late in the ſeaſon, I would adviſe them to be taken out of the old repoſitories in the month of March or April, picked and dried in the ſun, and placed in ſome proper dry ſituation, where the influence of neither cold nor warmth can affect them. And I would adviſe this practice to be followed in the former caſe, where potatoes are allowed to remain in the ground.

Directions for the uſing of Heather and Whins, for the relief of poor People in diſtreſs for Forage to their Beſtial.

IT is certain that all gregarious animals, in almoſt every ſeaſon of the year, but eſpecially when heather is in bloom, and whins in autumn and winter, greedily browze upon and eat the tender buds or crops of both. Yet ſo perverſe or inattentive are the poor people to their own intereſt, confining themſelves to their uſual habits, and impreſſed with prejudice againſt any relation, that very few, unleſs drove to it by dire neceſſity, uſe the means of relief from diſtreſs, though ſuggeſted, nay preſſed upon them.

Heather cropped by a hook or ſhort ſcythe, given freſh as cut, would not only keep their beſtial alive, when ſcarce of other provender, but feed them; there being great ſpirit in it, as is proved by diſtillation.

Anciently the general liquor of this country was chiefly from heather, with ſmall quantities of malt. Perhaps it hath not been tried, drying it when cropped, to keep and uſe as hay or ſtraw. But there is ſmall doubt of the certainty of its anſwering *when cut in bloom;* becauſe the bloom or flower, when ſtripped or gathered (which may be done

by

by children), and dried on lofts, has been long uſed with ſucceſs, to give to horſes in place of, or with oats.

Heather is every where in Scotland; nothing but dung and water ſuppreſs it; it is weakeſt, and leaſt of it, upon lime-ſtone.

As to whins, they will grow any where in Scotland, even on ſand, and at the ſea-ſide, or in any ſoil if dry; though when old they are liable to be injured by froſts, but ſeldom when young, or kept cut ſhort.

It is certain, there is ſcace any vegetable of which all gregarious animals are more fond, and proſper more remarkably upon for health or labour, when the tender crops are cut by gardener's ſciſſars, hooks, or ſhort ſcythes, and bruiſed by flails, mills, or engines like-wauk mills, or heavy ſtones going round upon edge, as a common bark or oil mill, to clear them from prickles, and reduce them to a ſoft pulp; which is much facilitated by putting water frequently upon them. If the engine is worked by a ſmall pony, a boy can drive him, and turn and water the whins: but it will require a man to cut them from the hedges or the fields, who ſhould have thick gloves or mitts, made of horſe leather, to preſerve his hands from being hurt by the prickles. Theſe, with very little hay or ſtraw, twice a-day, will ſupply eighteen or twenty large horſes or cattle, and in better ſpirits, with but half the grain, than upon hay, and full allowance of oats.

The whin is the cheapeſt, quickeſt, and moſt agreeable hedge of any, being always green; and in three years a good fence, if three rows are ſown to thicken and allow alternate cutting; which, when intended merely as a hedge, and not for provender, ſhould be done in ſummer, to prevent the froſt affecting the tender parts, which generally happens when cut after the froſts ſet in, eſpecially if the hedge is old. Cutting alſo prevents its fouling the land by ſpreading, and likewiſe its ſeeding; though the bloom adds greatly to its beauty, being very early. Major Hanbury Williams in Wales, mantained ſixty horſes for his iron-works by them for near five months in winter

winter, and adopted it from a poor man in a common, in a year of diſtreſs for forage. Many more reliefs may occur. Even broom (which will grow any where) will by ſhelter and ſhading leaves encourage graſs to grow in poor land, and preſerve it freſh long after all other graſs expoſed to the weather is gone; beſides being ſhelter to cattle, when it becomes high, and yielding two or three crops of tolerable oats after it, without manure or even tathing, as in folds, *&c.* And ferns when green, and moſt weeds which infeſt grain and graſs, and rob the land of its ſubſtance, are tolerable provender for all beſtial. The late Captain Campbell of Banna, in Argyleſhire, preſerved 800 cattle a whole winter, when the markets failed, and others loſt almoſt their whole ſtock, by driving them into a neighbouring fir-wood, and cutting gradually the branches of the firs, the green leaves of which maintained his cattle.

But winter-crops of turnip, potatoes, and curled kail, in large proportions of all their cultured land, are reckoned ſubſtantial reliefs for winter and ſpring, beſides feeding people, meliorating and cleaning all land, and rendering even poor soils fertile.

ARTICLE XLVIII.

ARATOR, *on the Deſtruction of Crows.*

[In a letter to the Publiſher.]

SINCE it ſeems an eſtabliſhed maxim among the farmers in general, that none can at once write upon the ſubject of agriculture, and be maſterly practiſers of it, I have hitherto cautiouſly avoided every thing which might have had the ſmalleſt appearance of entering upon that extenſive field, contenting myſelf with having mentioned in my firſt, [N° III. 117.] the method of management moſt commonly practiſed in this country. And ſure any body may have done this, without

without running the riſk of becoming bad farmers. Had I been in the leaſt apprehenſive of the contrary, I ſhould undoubtedly have thrown down my pen, burnt my paper, trampled the ink ſtandiſh under my foot, or (which would have been worſt of all) daubed my next neighbour's face with its contents; and thus, in the height of my fury, would have exclaimed, "What the d—l! ſhall I, in order to ſatisfy a "fooliſh deſire of appearing in print, to be ſtared by all "the readers of the Scots Farmer, wantonly ſacrifice my "character as a farmer, which otherwiſe I ſhall unqueſtionably "obtain! No, I ſhall not upon any account. Since I have "hitherto ſtruggled at the plough tail, and deſcended to all "the inferior operations of huſbandry; ſince I have acquired "the *meaſured ſtep* of the ſower, and how to ſcatter, by *liberal* "*handfuls*, the different grains, I muſt not be deemed uncapable even of theſe ſimple acts, which conſtitute the practical farmer, and that by my own fooliſh attempt to appear "among the ſpeculative ones!" In my laſt, [N° V. p. 227.] I mentioned the pigeons: I ſhall here mention the crows as very deſtructive animals to every corn country infeſted with them. Here too, Mr Printer, I think myſelf quite ſnug. No body can call a man a bad farmer, becauſe he knows that theſe creatures are very deſtructive to his fields, neither becauſe he ſpeaks out his mind among his neighbours; therefore ſurely from a parity of reaſon, no body can call a man a bad farmer becauſe he tells his grievance in writing. In ſpeaking of the pigeons, I mentioned the advantages and diſadvantages which moſt evidently reſulted from them, and the latter appeared at firſt ſight to preponderate. I did not, indeed, add to the account the circumſtance of their eating up the ſeeds of weeds, (which you extracted from the Muſeum Ruſticum) but this would have added, in my opinion, but very inconſiderably to the oppoſite ſcale. The pigeons, to be ſure, are very numerous, but when compared to the vaſt extent of land around them, how very inconſiderable is their number! I would

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obliged to you for inſerting the extracts immediately after my letter. They not only ſerved as corroboratives to the juſtneſs of my complaint againſt the pigeons, but to point out more exactly the real loſs attending them. As to the clergyman's epiſtle from the Muſeum Ruſticum——I am ſaying, that fallowing is much better for deſtroying every kind of ſeeds than ſwarms of pigeons, and attended with much leſs expence. By fallowing we are deprived of the produce of a field now and then, but doubly repaid for it ſome time after: But by the other method, we are ſubject to a yearly loſs without any thing conſiderable to balance it; for we cannot imagine that they will always continue to eat ketlock-ſeed, without now and then regaling themſelves with the wheat. I had above almoſt run into the ſtrain of writing, peculiar to a low, ill-bred, anonymous ſcribler, who would not ſcruple to ſtigmatize the above mentioned epiſtle with the illiberal epithet of chimerical; but though I do not think, nor have ever had the leaſt knowledge of the advantage of pigeons in the above mentioned caſe, I ſhould be far from inſinuating the leaſt diſreſpectful lybel againſt the reverend Mr Comber, or any body elſe, for the relation of a fact, though it may have to me a quite different appearance.

Now for the crows: It would be an unneceſſary and an endleſs, nay an impracticable taſk, to calculate the immenſe damage which the farmers ſuſtain from the crows. Let it ſuffice to mention, that they deſtroy the corns, both at ſeed-time and harveſt, in a moſt voracious manner, eſpecially the young wheat when it firſt appears. At this ſeaſon, how ridiculous is it to ſee the farmers, who deal extenſively in this article, employing a number of herds to halloo and cry, to frighten them off one field away to another, when they might make a total extirpation of them all at once at much leſs expence! A number of them indeed alledge, as an argument for the crows, that beſides their natural right to exiſtence, which the great author of life had been pleaſed to grant them, they had an acquired

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one from their immediate uſe to mankind in the deſtruction of a noxious vermin which infeſts the fields. But as to this argument, though the parent of nature has been pleaſed to beſtow life upon the creatures, yet as he has made Man lord of the creation, and granted him a diſcretionary power to uſe them in a manner the moſt conducive to his happineſs, conſiſtently with that humanity implanted in his very ſoul, I can ſee no reaſon why he may not at leaſt reduce their number in ſuch a manner, that they can do no hurt to the country. It is only upon rich loamy ſpots that they have many worms to deſtroy. At the concluſion of my laſt, I mentioned Binning-wood at Tynningham as the principal ſource of this vermin. It would therefore be moſt proper to begin there, after having obtained authority of the Earl of Haddington as, in the firſt place, abſolutely neceſſary. His Lordſhip, I am fully perſuaded, would not be ſlow to give his conſent to a thing of ſo much importance to the tenants; nor would the tenants themſelves be backward to contribute their ſhare for this valuable end; a valuable end indeed! ſince hereby they ſecure to themſelves, and to the country, a very conſiderable quantity of corn, which otherwiſe they would unqueſtionably loſe. Farmers, who are obliged to employ one, two, or three people to keep their corn, and to pay them duly every time they are thus employed, could not, one would think, ſcruple to pay a conſiderable ſum, in order to be freed of ſuch an annual expence; much leſs can they be backward to pay ſuch a ſmall ſum as two ſhillings per plough: This would amount to a very great ſum. The number of ploughs in this country is about 1124; now two ſhillings per plough would amount to L. 112. 8s. Were it neceſſary, I could mention the number of ploughs in every pariſh in Eaſt-Lothian, and how much each by itſelf could produce at the above rate for this purpoſe; but it would ſwell this letter to too great a ſize, and it would anſwer but little end. All that I wiſh is, that ſomebody of a general acquaintance amongſt the farmers

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would concert a plan, levy the money, and have it applied immediately to the extirpation of the crows. The end of this month, and former part of May, is the beſt time for deſtroying them. At that time the young ones, which we call branchers, are unable to fly, ſo that an expert climber may catch them with great eaſe; beſides idle boys, many labouring ſervants would engage at their ſpare hours to plunder them; and though the one half of the farmers in this country ſhould diſagree to the plan, or though they ſhould pay but in proportion to the damage they are liable to, the remaining part of the money would do an immenſe ſervice in this way.

The reaſon of my mentioning the crows in this letter, was an occaſional converſation ſome time ago with a very judicious practical farmer. Having as uſual entered upon the object of agriculture, we ſtumbled at length upon the SCOTS FARMER. I aſked him his opinion of it; to which he anſwered, "For my part, I dont think the Scots Farmer worth a two-pence halfpenny. It is juſt——" Stop ſays I, you'r far enough; two-pence halfpenny! Is not the plan well enough deſigned, and is it not ſo far well enough?——"It is juſt (for he continued chewing his laſt words) a printer's job; and Ruſticus, and Arator, and a' theſe gentry, are juſt ſome friends of his, who want to promote his intereſt as far as they can. Arator indeed ſpeaks of the pigeons as deſtructive to the corn, and places the ſtory of Mr **** and W— K— in its true light, ſo that it's certainly not the printer himſelf who writes it, and Ruſticus — but what I would be at is this; I dont think we have any need of a work of that kind at all, ſince it's not in the knowledge, but in the practice of agriculture that we fall ſhort. What! does Arator, or any of theſe blades, think to become a rule to me, or—;" But would not it be much better, if the printer had ſome correſpondents in different parts of the country of eſtabliſhed characters, as farmers, to communicate their obſervations and experiments through the ſame channel. This, I own, would be of ſome importance; it would at once

'put a ſtop to all the anonymous writers, and make us farmers
'depend upon what is laid before us: The reputation of th
'men, as farmers, would effectually guard them againſt commu
'nicating any thing of a trifling nature, and would even mak
'them exert themſelves in the public ſervice, in collecting ma
'terials from the obſervations of ſome truſty friends, which migh
'be well worth the public notice: Whereas, on the other hand
'the nameleſs writers, lurking behind the curtain, and in n
'danger of being expoſed to public view, will not ſcruple t
'aſſert the reſult of experiments, which perhaps they neve
'had the patience to give an impartial trial. But beſides, (
'make no mention of ſoil and climate) what do all our know
'ledge and experience derived from the Scots Farmer ſignif
'to us, if thoſe who are kind enough to hand them down mak
'not the leaſt mention of the weather, that circumſtance in
'diſpenſibly neceſſary in every experiment of this kind; y
'how very ſeldom do we ſee this mentioned, as if it had not th
'ſmalleſt concern with them? Now, was the Scots Farmer
'be conducted in this manner which I have humbly propoſe
'—— yet (as I ſaid before) I think there is little or no occ
'ſion for it at all, ſince it's in the practice, and not in the know
'ledge, of farming that we fall ſhort. We all know, for e
'ample——' 'Not to interrupt you ſir, ſays I, I ſincerely agr
'to what you have ſaid; and though I would not ſuſpect Arato
'or any of theſe anonymous ſcriblers, of diſhoneſty, yet
'think, to have men of eſtabliſhed character for correſponden
'who would not ſcruple to put their own names to their le
'ters, would prevent all ſuſpicion on that head. But o
'conſequence of it is plain: The liberty of writing, and co
'ſequently the opportunity of being uſeful to ſociety, is to ſo
'an inducement to make repeated experiments in agricultu
'Encourage this, and a ſpirit of emulation will ſoon take pl
'amongſt ingenious farmers, to all in making uſeful diſcover
'in that noble art; but if otherwiſe——' Here my friend,
finiſh what he was going to ſay, when he was ſo unſeaſona
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interrupted, ſtopt me ſhort. 'We all know, for example, that fallowing is of vaſt importance to a farm; that the oftener we plow and harrow it for taking out the graſs-roots, the better; that the oftener we can promote the vegetation of the annual ſeeds which lye concealed in the ground, the leſs will we be troubled with them amongſt our corn; that the more dung we can raiſe for manure, the more plentiful may we expect our crops.'— 'Very well, you'r right.'— 'Theſe (continued he) need but cloſe application, they have nothing to do with your theory as you call it. But after all, what does it ſignify, that we know how to communicate the food to plants, or the vegetative power to the earth; that we know the qualities of the different manures, and that lime is but a kind of ſtimulus to land, making it exert all its ſtrength, and then leaving it in an impoveriſhed ſtate, if we cannot contrive a method of deſtroying the crows and pigeons. Weeds and water may be *impediments to vegetation*, and we have very good methods of removing them: but to what purpoſe do we remove them, when we ſuffer theſe to continue to eat up ſo much of our crop. I earneſtly wiſh ſome body would lay before the farmers, how much they could eaſily raiſe at a few ſhillings per plough, and perhaps the hint may be improved. It would be a matter of no great difficulty to hire boys, &c. for this end——." I am,

SIR,

Yours, &c.

ARATOR.

Eaſt-Lothian,
April, 12th, 1773.

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ARTICLE XLIX.

On the uſes to which Carrots my be applied by the intelligent and induſtrious Farmer.

[From the Muſeum Ruſticum, Vol. I.]

BLAME me not for wiſhing to rank myſelf in the number of your public ſpirited correſpondents. I ſee in your collection many hints which cannot fail being extenſively uſeful.

Being willing to contribute my mite towards ſo valuable a work, I ſhall make the uſes to which carrots may, by the farmer, be applied, the ſubject of my preſent letter.

And firſt I muſt mention, that nothing can exceed this root for fattening oxen * ; but they ſhould have ſome ſweet hay to eat with it, and they will thrive much better on it if they are ſtalled. They eat it with great greedineſs ; it nouriſhes them much, and ſoon makes them fit for the butcher ; and if they are young beaſts, they always turn out fine meat.

Some oxen will not take kindly to eating them raw at firſt ; for theſe, it is proper they ſhould for a time be parboiled ; but they muſt every day be leſs and leſs boiled, till they come to eat them quite raw, which in a little time the niceſt beaſt will not be averſe to.

I find alſo carrots excellent for encreaſing the milk of cows, eſpecially in winter time, and early in the ſpring, when there is a ſcarcity of graſs ; and the milk they give when they feed on them has no bad taſte ; but the butter made of the cream is generally a little higher coloured, being a full yellow ; yet this is no inconvenience, as it is not worſe in quality than

* Much has been ſaid and written in praiſe of this root, as being a very hearty food for moſt ſorts of animals : it has even been aſſerted, that one acre of carrots, properly planted, will fatten a greater number of ſheep, or bullocks, than three acres of turnips ; and that the fleſh of theſe animals will be firmer and better taſted

that which is made when the cows feed in the ſummer months on the ſweet meadow-graſs.

I have, as yet, had but little experience reſpecting the uſe of carrots in feeding ſheep: it is true, I have fed a few on them, and they come on well; but whether they are more profitable, when applied to this uſe, than turnips, I cannot determine. The public would be greatly obliged to ſome of your readers, if they would make a fair experiment in this matter: the way to do it would be, to pick out of the ſame flock an equal number of weathers, if poſſible, equally thriving: let one half of theſe weathers be put to turnips, and the other half to carrots, being in every other reſpect managed alike.

Frequent obſervations ſhould from time to time be made on their health; and when they are fat, it may with great eaſe be pronounced, which is the food that can with the greateſt profit be given them.

If they are equal in their effects, the farmer muſt always govern himſelf by his convenience, and which ever of the crops beſt ſuits him, that he is chiefly to cultivate.

Many farmers ſow turnips inſtead of fallowing their land for wheat; and this is good huſbandry; but if the ſoil is proper for carrots, it would be much more profitable for the farmer to ſow them, and that for theſe very obvious reaſons; becauſe they impoveriſh the ſurface of the ſoil leſs, extracting the chief part of their nouriſhment from a great depth; and as they require that the land ſhould be deeper plowed, of courſe it will be in better tilth againſt the wheat ſeaſon, and be in much better order to receive that noble ſeed.

Hogs are very fond of carrots, and they make them thrive apace; but they ſhould always be given to them boiled, as they will with great difficulty be induced to eat a ſufficient quantity of them raw.

This food fills them ſpeedily with fleſh, and will very well make them much more than half fat: it will be proper however to give them, before they are killed, either a few buſhels of bar-

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ley-meal, or ſome gray-peaſe boiled: either of theſe foods will complete their fattening to admiration; though, for my particular part, I approve moſt of the peaſe, as they make the fat firmer, and waſte leſs in the pot.

Were the hogs to have nothing but carrots given them when they were put up to fat, this root would, it is true, fill them up with flaſhy fat and fleſh; but they would not ſpend ſo well, neither would they be ſo proper to pickle for pork, or to be made into bacon for keeping the whole year round.

I cannot help taking notice of one uſe to which I have applied this root, as it is quite out of the common road: I have fed dogs with it, and am morally certain, that with the aſſiſtance of it a pack of hounds might be kept at a much cheaper rate than is now practicable with any other food.

I have not, it is true, experienced this, becauſe I keep no hounds; but I have three brace of pointers, and ſix couple of cock dogs, which I have for a whole year together kept on no other food but boiled carrots, ſome flet milk and barley-meal being mixed with the liquor they were boiled in.

Before I came into this practice, I always uſed to feed my dogs with either horſe-fleſh, or barley-meal: when they had plenty of the firſt, I ever obſerved that they were remarkably ſubject to the mange; and if my dog-boy could not for any length of time get the carcaſe of a horſe, ſo as that my dogs were obliged to eat barley-meal alone, though they got fleſh, the barley was of ſo hot a quality, that their coats would be quite rough, and ſtand an end on their hides.

Since I have fed them with carrots in the manner above deſcribed, I find, with pleaſure, that the natural coolneſs of the roots abates the heat of the barley, or at leaſt qualifies it; and my dogs are always in good order, high wind, and conſtant health.

This matter is well worth the attention of your readers, as many gentlemen might ſave large ſums of money annually by putting it in practice. I find the uſe of carrots ſaves me, at leaſt

leaſt, three parts in four of the quantity of barley-meal I formerly uſed; and as to the ſkimmed milk, if it cannot be got in quantities at a very cheap rate, it may, without any very apparent difference or bad conſequences, be omitted.

Another thing, well worth the attention of your gentlemen readers, I ſhall now take notice of, which is, that they cannot find a better, or more heartning food for their hunters than carrots, if given them with diſcretion; as to common plow, and cart horſes, they may eat them indiſcriminately; and this root will be found a very cheap food for them, as they need have no corn, and much leſs hay than they would otherwiſe eat.

I have a couple of hunters, which I value as being very good horſes; and theſe I feed in the ſeaſon with very little elſe beſides carrots, well cleaned from the dirt that naturally hangs about them, and loaves made of the mixed meal of barley and oats, ſometimes with a ſmall admixture of coarſe, but good wheat-meal; and if they require to be looſened in their bodies, I now and then give them ſome bran. As to hay, they eat, at this ſeaſon, but little of it, of oats none at all; yet they go through their work to admiration.

I have, all my life, heard it ſaid, that carrots were exceeding good to make a horſe long-winded; and ſome jockeys will, I have been informed, feed a broken-winded horſe ſome little time with carrots before they ſell him, when he may very well be paſſed off for a horſe that is only a little thick-winded.

A horſe-dealer in my neighbourhood, when he buys a poor half-ſtarved beaſt, if he has youth on his ſide, always fats him up with carrots before he takes him to market; and this practice he finds to anſwer well, as the horſe is ſooner got into good fleſh with carrots than any other food; and they are beſides wholeſome, breeding in him no foul humours.

All the danger ſeems to be to the purchaſer, who, if he imprudently puts the horſe immediately to hard work, is in a manner

manner ſure to break either his wind, or his heart; for as the horſe was very ſuddenly got into fleſh, his ſtrength is not proportioned to his bulk, till he has been kept ſome time on dry meat, which will bring him about, and make him ſoon fit for any reaſonable work.

That a horſe thus fed ſhould not be immediately fit for any hard labour, muſt not be uſed as an argument againſt carrots being a proper food for horſes. It muſt be conſidered that this man takes a half-ſtarved horſe, and gives him at once his fill of a nouriſhing food, in fact too nouriſhing, as it fills him with fleſh faſter than he can have time to gather ſtrength. It muſt alſo be conſidered, that during the time of his being fed on this root, he is not permitted to take any exerciſe; by which means the free circulation of his blood is greatly impeded, and he muſt of courſe be the leſs fit to be immediately, and without previous caution, put to hard labour.

A horſe, in this caſe, muſt have a ſuperabundant humidity, which would by perſpiration have been carried off, had he been permitted to have exerciſed himſelf moderately; but this being prohibited to him, though the humours whilſt he is thriving continue as it were ſtagnant and innocuous, yet when once ſet in motion by too hard labour ſuddenly given, they naturally become peccant, and ſhew themſelves in different ſhapes.

I hope I have ſaid enough to vindicate my favourite root from any aſperſion †: I have found it very good and ſerviceable: as ſuch, therefore, I cannot but in juſtice report it.

† Mr Miller adds another uſe to which carrots may profitably be applied. He has, he ſays, known them cultivated for feeding deer in parks, which has proved of excellent uſe in hard winters when there has been a ſcarcity of other food: in ſuch times great numbers of deer have periſhed for want, and thoſe which have eſcaped have been ſo much reduced, as not to recover their fleſh the following ſummer; whereas thoſe fed with carrots have been kept in good condition all the winter, and upon the growth of the graſs, in the ſpring, have been fat early in the ſeaſon.

THE SCOTS FARMER,

MAY 1773.

ARTICLE L.

Of the methods of yoking cattle in ploughs—Of plowing.

[Dickſon's Agriculture, Vol. I.]

Of the methods of yoking cattle in ploughs.

HORSES and oxen are the animals uſed for drawing ploughs. Sometimes the one, ſometimes the other, and ſometimes both together. It is impoſſible to determine which of theſe is the moſt proper. This depends upon the kind of food moſt eaſily obtained, the other kinds of work required, and the expence of breeding, or purchaſing. If the real labour is to determine this without any other conſideration, then oxen are to be preferred; becauſe, as they ſtand to the draught, they will overcome a reſiſtance which horſes will yield to.

As it cannot be determined, what kind of cattle are moſt proper for the plough; ſo neither can it be determined, what number is neceſſary. This depends upon the ſtrength of the cattle, and the nature of the ſoil. The number varies according to the work in which the plough is to be employed, and often according to the cuſtom of the place, and fancy of the farmer *.

The

* All the following varieties are uſed: two horſes; three horſes; three oxen and one horſe; two oxen and two horſes; four horſes; two oxen and three horſes; four oxen and one horſe; five oxen; four oxen and two horſes; ſix oxen and one horſe; eight oxen; ſix oxen and two horſes; and four oxen and four horſes.

The methods of yoking cattle in ploughs vary almoſt as much as the number uſed †. Some of them at firſt ſight are ſo aukward, that it is needleſs to conſider them. The only thing worthy of being inquired into, is, whether the cattle ſhould be yoked in pairs, or in a line before each other? We ſhall therefore conſider the advantages and diſadvantages attending each way, and compare them together.

The moſt common way of yoking cattle in ploughs is in pairs. There are ſome diſadvantages attending this way, that are obvious In plowing the furrows betwixt ridges, the land cattle go upon the plowed land, and tread it down with their feet: this, eſpecially if the land is wet, hurts it very much.

There is another diſadvantage very obvious. When there is but as much of the ridge unplowed as to allow the land cattle to go upon it with difficulty, they are frequently either going into the oppoſite furrow, and thereby giving the plough too much land; or, which is worſe, they are juſtling the furrow-cattle upon the plowed land.

To remove theſe inconveniencies that attend the plowing with

horſes. The four oxen and one horſe, or the ſix oxen and one horſe, are only uſed in a ſtrait, when another horſe cannot be eaſily procured The cuſtom of uſing three oxen and one horſe, is but lately introduced, and is obſerved in very few places: every one of the others mentioned is the eſtabliſhed cuſtom in ſome parts of the country.

† The two horſes are in ſome places yoked abreaſt, and in others, before each other; the three horſes all abreaſt, two abreaſt and one before, or all in a line; the three oxen and one horſe all in a line; the two oxen and three horſes, the oxen abreaſt behind and the horſes abreaſt before; the four oxen and one horſe, and the ſix oxen and one horſe, the oxen in pairs, and the horſe before the ſix oxen, the four oxen and two horſes, the eight oxen, the ſix oxen and two horſes, and the four oxen and four horſes, in pairs; the four horſes all abreaſt, in pairs, or all in a line.

with the cattle yoked in pairs, ſome yoke them in a line before each other. It is obvious, that cattle yoked in this manner, going always in the furrow, neither tread upon the plowed land, nor juſtle one another. In theſe reſpects the yoking the cattle in a line before each other, ſeems to have the advantage.

It is to be obſerved, however, that this method is not quite free from inconveniencies. When examined, it may perhaps be found attended with as great inconveniencies as the other.

When cattle are yoked in a line, they go all in the furrow. This makes it neceſſary to give the plough more land than ordinary, either by the ſock or the muzzle: for, if this is not done, the head and ſock being in the ſame direction with the beam, and the cattle yoked to the middle of it, the plough will directly follow the cattle, without taking any thing off from the land. Now, it is inconvenient to be obliged to give the plough land either by the ſock or muzzle; for, when the ſock is turned out of the plane of the beam, it makes the plough heavy to draw; and when the muzzle puts the draught too much to one ſide of the beam, it prevents the plough from going upright *. The yoking the cattle in pairs is attended with none of theſe inconveniencies: for, in this caſe, the quantity of land, which the plough has naturally, when right made, is ſufficient to make it take off a proper furrow.

There is another inconveniency that attends yoking cattle in a line, ariſing from the nature of the animals. Horſes and oxen, like men, love their eaſe, and are diſpoſed to throw the burden upon their fellows. This they have a better opportunity of doing when yoked in a line before each other, than when

* It is obſerved, that when, by a broad muzzle, the draught is removed to a certain diſtance from the beam on either ſide, the deſign is fruſtrate. For the plough is ſo much turned to one ſide, as to loſe as much by the direction of the irons, as is gained by the breadth of the muzzle.

when yoked in pairs. When yoked in a line, each pulls by the traces of the one behind him; and therefore, though it may be known when the foremoſt neglects his work by the ſlackening of his traces, yet it cannot be known when any of the reſt neglect their work; for though one of them does this, yet, by the pulling of the one before him, his traces may be fully ſtretched. But this is eaſily diſcovered, when the cattle are yoked in pairs; for then every one of them has a ſeparate draught. The goadman or driver knows, by the poſition of the yokes or croſs-trees, whenever one of them does not draw equally with his fellow; and the plowman perceives, by the going of the plough, whenever any of the two pairs does not draw equally with the other *: for if the pair that goes foremoſt neglect their work, the plough is pulled out of the ground; and if the pair that go hindmoſt neglect their work, the plough is pulled in too deep. The reaſon is obvious; the plough is made to go at a proper depth, when the two forces by which different directions are given the plough, act at the ſame time. If one of them then ſhould ceaſe to act, the plough cannot go right. If the foremoſt part ſhould ceaſe to draw, the plough having too little eard for the direction of the draught of the hindmoſt pair, will come out of the ground; and if the hindmoſt pair ceaſe to draw, the plough having too much eard for the direction of the draught of the foremoſt pair, will go in too deep. This does not hold in an ox-plough; for as the ſoam by which the foremoſt pair draw, is fixed to the yoke of the hindmoſt pair, the whole force applied to the plough is in the ſame direction; and therefore, though any of the pairs ceaſe to draw, there is no alteration in the going of the plough.

There is yet another inconveniency that attends the common way of yoking cattle in a line before each other. When the

* A horſe-plough is here meant, and it is ſuppoſed that there are only two pair in the plough.

the fore cattle are all yoked to the traces of the hindmoſt, it is obvious, that as the beam, to which the draught is fixed, is much lower than his ſhoulders, by which the reſt pull, ſuch a weight muſt be laid upon his back or ſhoulders as muſt render him incapable of giving any aſſiſtance *. Beſides, as the whole force is applied in the direction of the traces of the hindmoſt horſe; it cannot have ſuch influence on the plough, as when a part of it is in a direction more horizontal. When a body is to be moved forward in any direction, the nearer that the direction of the force applied approaches to the direction of the body, it acts with the greater influence. And therefore, as the plough moves horizontally, and as the direction of the united draught of a plough with the cattle yoked two abreaſt, is more horizontal than the direction of the draught in a plough with the cattle yoked in a line, the ſame force applied will have greater influence.

When theſe two different ways of yoking cattle in ploughs are thus conſidered and compared together, it is difficult to determine which ought to be preferred. Each of the two ſeems preferable to the other in a certain ſituation. When the land is ſtiff, and the labour ſevere, the yoking the cattle in pairs ſeems preferable, as it is certainly the ſtrongeſt draught; and when the land is wet, and in danger of being much hurt by the treading of the cattle, the yoking them in a line before each other ſeems preferable; as thereby they are confined to the bottom of the furrow, which is the firmeſt part of the land, and prevented from doing harm.

When a perſon uſes two or more ploughs, it is a very proper way to have one with the cattle yoked in a line, and the reſt with the cattle yoked in pairs. The ploughs with the cattle yoked

* Perſons that yoke cattle in a line are obliged to put a kind of ſaddle betwixt the back of the hindmoſt and the back-rope; this indeed prevents the horſes back from being galled, but does not ſave him from the weight.

yoked in pairs continue as long as the land-cattle have room to go eaſily upon the firm land; and the plough with the cattle yoked in a line, follows, and clears up the furrows. In this way the cattle yoked in pairs do no damage, and the cattle yoked in a line are never uſed but where they are of real benefit.

To perſons that incline to yoke the cattle in a line before each other, it will not be amiſs to point out a way to remove the inconveniency laſt mentioned, and ſhow how the cattle may be yoked ſo as to lay no additional weight on the back or ſhoulders of the hindmoſt horſe, and to make the direction of the draught more horizontal. This is done by making the traces of the horſe next to the plough but one, very long, and fixing them, not to the ſhoulders of the horſe behind him, but to the croſs-tree, and by fixing the traces of the horſe before him, not to his ſhoulders, but to his traces at the place where the back-rope is fixed. By this the hindmoſt horſe is delivered from the burden laid upon him in the other method, as his draught is entirely independent of that of the reſt. There is indeed ſome weight laid upon the horſe immediately before him, to whom the others are yoked. But this is but ſmall; for his traces are nearly in the ſame direction with theirs, and they are yoked to him at a place lower than his ſhoulders. By this, likewiſe, the direction of the united draught is more horizontal, when there are three or more horſes yoke; it is even more horizontal than when the cattle are yoked in pairs. In a four horſe plough yoked in pairs, the two forces are equal; but in a four horſe plough yoked in this manner, the force moſt horizontal is to the other, as three to one.

The traces of the horſe hindmoſt but one being long, will incommode the hindmoſt horſe in turning, if they have nothing to ſupport them. To prevent this, two links muſt be fixed to the ſhoulders of the hindmoſt horſe, and the traces paſſed

paſſed through them; and the links long enough to allow the traces to be ſtretched.

When two horſes are ſufficient for the draught, the yoking them in this manner deſcribed for the two hindmoſt, removes alſo the ſecond inconvenience mentioned, that attends the yoking cattle in a line; for the plowman diſcerns, by the going of the plough, when any of them neglect their work, in the ſame manner as when there are four horſes in the plough yoked in pairs.

The ordinary method of yoking oxen, is attended not only with all the inconveniencies of yoking cattle in pairs, but alſo with the laſt mentioned inconveniency of yoking cattle in a line: for the ſoam by which the foremoſt cattle draw, is fixed to the yoke of the hindmoſt pair. Their yoke being higher than the beam, a great weight is laid upon their necks by the drawing of the foremoſt cattle. This inconveniency may be removed, and the oxen yoked in ſuch a manner, as to give two directions to the plough, as is done when horſes are yoked in pairs; by which the draught will likewiſe be made ſtronger. To do this, the ſoam of the pair immediately before the hindmoſt muſt be fixed, not to their yoke, but to the beam; and, to prevent this ſoam from incommoding the hindmoſt in turning, a link muſt be fixed to their yoke for it to paſs through, the link long enough to allow the ſoam to be fully ſtretched. When there are more than two pair in the plough, as is moſt common, the largeſt-ſized cattle ſhould be placed next the plough, and the ſmalleſt-ſized immediately before them: for the lower that the yoke of theſe laſt is placed, the nearer will the direction of their ſoam be to the ſoam of thoſe before them; and thereby the leſs weight laid upon their necks. This method of placing the cattle is contrary to the ordinary way: for it may be obſerved, that the ſmalleſt-ſized oxen are always placed next to the plough. But for the ſame reaſon, that theſe are placed neareſt the plough, in the ordinary way of yoking, ought they to be placed in the middle,

in

in the other way: for the ſmalleſt-ſized oxen are placed next the plough in the ordinary way of yoking, that ſo their yoke, to which the ſoam of the pair before them is fixed, may be as low as poſſible: for the lower that it is placed, the nearer the directions of the two ſoams approach each other, and the leſs weight is laid upon the necks of the hindmoſt pair. And, for the ſame reaſon, the loweſt ſized oxen ſhould be placed in the middle, when yoked in the manner propoſed, that ſo they may be leſs incommoded by the pair before them.

A method of yoking oxen has been lately introduced, which, if known, will probably in a ſhort time be univerſally practiſed. It is not liable to the inconveniencies attending the ordinary method. Inſtead of heavy yokes lying upon their necks, which muſt be a great interruption to their drawing, they are yoked in the ſame manner as horſes with *brechems*, collars, and traces. The brechems are made of the ſame materials, and are of the ſame form with thoſe uſed for horſes, only the upper part is open, for the conveniency of putting on and taking off, and tied by a piece of cord. Oxen with theſe brechems and traces, may be either yoked in a line, or in pairs. If in pairs, inſtead of uſing a ſoam, and croſs trees for the ſecond pair, as is commonly done in a four horſe plough, this pair may be yoked to the croſs trees of the pair behind them, in the ſame manner as we have directed the ſecond horſe to be yoked in a horſe plough, when they are in a line.

If, in conſidering the moſt proper method of yoking cattle in ploughs, we had nothing in view but the ſtrength of the draught, and conveniency of the cattle: we would always recommend the yoking the cattle in ſuch a way, as to apply two forces to the plough in different directions. But as we muſt alſo have in our view the going of the plough, hence it becomes neceſſary to obſerve, that ſometimes it is an advantage to have the draught of the whole cattle in the ſame direction.

In plowing lea, where the ſward is tough, or any kind of land where there are interruptions from roots, or the hardneſs

of the bottom; the plough, if two forces are applied to it in different directions, goes very unſteadily, ſometimes too deep, and at other times too ſhallow; and is very difficult to manage. The reaſon is obvious: When the plough meets with ſuch interruptions, as tend to make it go deeper, or ſhallower, than its ordinary way of going; if, at the ſame time, the force that acts contrary to the interruption ceaſes; then the plough, in ſpite of all the attention of the plowman, will either ſtart out of ground, or go in too deep, according to the tendency of the interruption. But when there is only one force acting upon the plough, it is, in ſome reſpect, like the wheeled plough; it goes ſteadily, and at a certain depth; at leaſt, it is not ſo difficult to manage it, as when there are two forces acting in different directions: for though ſome of the cattle, at the time when the interruption is given, ſhould ceaſe to draw, yet the draught continues ſtill in the ſame direction, and the plowman has only the alteration, occaſioned by the interruption, to rectify. Every perſon knows, that an ox-plough goes much more ſteadily than a horſe-plough: and this is occaſioned, not only by the nature of the animals, oxen being more ſteady in drawing than horſes, but alſo by the manner of yoking them, oxen being yoked in ſuch a manner as that one force only is applied to the plough.

Thus it appears, that no abſolute determination can be given, which of theſe two ways of yoking cattle in ploughs is to be preferred. Men muſt weigh the advantages and diſadvantages attending each way, and determine according to circumſtances. If the land is of a kind not eaſily plowed, the cattle not well trained, and the plowman not expert, the work will be beſt performed, if there is only one force applied to the plough *.

But

* When there are four horſes in the plough in pairs, they are commonly yoked in ſuch a manner as to apply two forces to the plough in different directions. If it is found proper to apply but

But if the land is eaſy plowed, that is, has few things in it to incommode the plough in going; if the cattle are well trained, and the plowman expert, the work will be well enough performed, and the labour leſs ſevere upon the cattle, if two forces are applied to the plough in different directions.

Of Plowing.

The action of the plough, in ſtirring and turning over the ſoil, is called *plowing*. Plowing then ſerves the following purpoſes: It increaſes the food of plants, enlarges their paſture, prepares the vegetable food for entering their roots, deſtroys weeds, and removes wetneſs.

Plowing encreaſes the food of plants, by opening the ſoil to receive the vegetable food from the air; and by enlarging the ſurface, and thereby expoſing a greater quantity of the ſoil to its influence.

Plowing enlarges the paſture of plants, by opening the ſoil, if too ſolid, and making it firm if too light.

Plowing prepares the vegetable food for entering the roots of plants, by reducing vegetables to a ſtate of corruption, and diſſolving oils.

Plowing deſtroys weeds, by making their ſeeds vegetate, and then tearing up the young plants; and by expoſing their roots to the drought.

Plowing removes wetneſs, by laying up land in proper ridges.

It may be ſaid, therefore, that plowing is one of the moſt important operations in agriculture; and that the greateſt care is to be taken in the performance of it.

Though

one force to the plough, and keep the horſes yoked in pairs, the firſt pair muſt be yoked to the laſt, in the ſame manner as the two laſt horſes are commonly yoked to each other, when there are three or four yoked in a line.

Though plowing in general ſerves all the purpoſes mentioned, yet commonly one of them only is chiefly in view; and according to the deſign in view the work is to be performed.

When the deſign of plowing is to encreaſe the food of plants, the ſurface cannot be made too uneven; for the more uneven that the ſurface is made, the greater quantity of the ſoil is expoſed to the influence of the air, and the greater quantity of food procured*.

When the deſign of plowing is to enlarge the paſture of plants, that kind is beſt that goes deepeſt, (provided the ſoil allows), and moſt effectually breaks the mold; for the deeper that the plough goes, the greater quantity of ſoil is employed in vegetation; and the more effectually that the mold is broken, the larger is the paſture in the ſame quantity †.

When the deſign of plowing is to deſtroy root-weeds, the ſurface cannot be left too rough, nor the earth of the furrow raiſed in too large pieces; for the rougher that the ſurface is, and the larger the pieces of earth raiſed, the drought has the eaſier acceſs, and more effectually operates in the deſtruction of the roots.

When the deſign of plowing is to deſtroy ſeed-weeds, the ſurface cannot be made too ſmooth, nor the mold too much broken: for the ſmoother that the ſurface is made, and the more effectually that the mold is broken, the ſeeds are the more expoſed to the influence of the air, the ſap better preſerved, and their vegetation the more encouraged ‡. When

* The increaſing of the food of plants is often the chief deſign of fallowing, and of giving the barley-land the winter and ſpring plowing.

† The enlarging the paſture of plants is the chief deſign of plowing, when ſeed is to be ſown immediately after.

‡ The deſtruction of weeds of both kinds is often the end propoſed in ſummer-fallowing, and when the barley-land gets the ſpring-furrow.

When the deſign of plowing is to remove wetneſs, the land muſt be laid up in high and narrow ridges; for the greater number that there are of furrows, there are the greater number of drains; and the higher that the ridges are, the more eaſily the water finds its way to the furrows.

Thus we ſee how this operation of plowing is to be performed, according to the chief deſign in view. It often happens, however, that land is in ſuch a condition as to require more than one of theſe advantages which plowing is intended to promote. Theſe are ſometimes conſiſtent with each other, and the land may be plowed in ſuch a manner as beſt to promote all of them. Thus land is ſometimes, at the ſame time, poor and wet, and full of root-weeds: now, it may be plowed in ſuch a manner, as is moſt proper for increaſing its food, removing its wetneſs, and deſtroying its weeds: for, by one plowing, its ſurface may be made uneven, which fits it for receiving an increaſe of food; it may be formed into narrow and ſteep ridges, which beſt removes its wetneſs; and the earth may be raiſed in large pieces, which beſt expoſes the roots of the weeds to be deſtroyed by the drought.

At other times the land is in ſuch a ſituation, that the advantages which it requires from plowing are inconſiſtent with each other, and it cannot be plowed in ſuch a manner as is moſt proper for promoting all of them. Thus land, at the ſame time, may be full both of ſeed-weeds and of root-weeds: now, it cannot be plowed in ſuch a manner as is moſt proper to deſtroy both; for, by one plowing, it cannot be raiſed in pieces and left rough, which is neceſſary to deſtroy root-weeds, and have the mold broke and be made ſmooth, which is neceſſary to deſtroy ſeed weeds. This makes it neceſſary to have one of theſe things chiefly in view at firſt, and to conſider which of the two it is proper to begin with, and how the work may be performed in ſuch a manner, as the other may moſt eaſily ſucceed. Thus, in the preſent caſe, the land ſhould be plowed, ſo as to be raiſed in pieces, and to be left rough;

ough; and in that condition it ſhould be allowed to lye, till he drought may be ſuppoſed to have deſtroyed the roots; and hen it may be reduced, the pieces broke, and the ſurface nade ſmooth, in order to deſtroy the ſeeds.

In plowing there are ſome general rules to be obſerved, whatever is the deſign of it. Thus, land is never to be plowed when it is wet. When land is plowed wet, the deſign of lowing, whatever it may be, is fruſtrated; and this holds rue in every kind of ſoil.

When ſtiff ſoil is plowed wet, by drying too ſuddenly it becomes ſo hard, that it can receive no benefit from the air, and he paſture in it is entirely ſhut up: root-weeds ſtrike root gain before the drought reaches them; and if there are any eed-weeds, the ſurface cruſts ſo ſoon, that they are prevented om vegetating.

When light ſoil is plowed wet, though it may receive ſome enefit by expoſing a larger ſurface to the influence of the ir, yet its pores, being full of water will prevent its paſture om being enlarged; and the root-weeds that are in it, will ot be deſtroyed; they will rather flouriſh, by being tranſplanted into a new paſture *. In both kinds of ſoil the labour is ry ſevere upon the cattle, and the land is greatly damaged y their going upon it, and treading it down with their feet.

Thus it is alſo to be obſerved, that whatever is the deſign of lowing, the quantity of firm land taken off from the ſurface the plough in going, ought not to exceed the wideneſs of e furrow which the plough makes below. If it does, the nd is not clean plowed: it is only ſcratched, and a quantity the ſoil is left below untouched betwixt every furrow that e plough makes.

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* By light ſoil is here to be underſtood not ſandy, but ſpungy offy ſoil. The ſandy ſoil is in its nature ſo free, and at the ſame me ſo compact, that little alteration can be made in its paſture plowing.

The quantity of firm land to be taken off by the plough depends upon the deſign of plowing, and the nature of the ſoil.

When the deſign of plowing is to increaſe the food of plants, and deſtroy root-weeds, whether the ſoil is ſtiff or light as great a quantity may be taken off as the plough can take conveniently; becauſe the greater that the quantity is which the plough takes off, the rougher and more uneven the ſurface is made; and the rougher and more uneven that the ſurface is made, the more food is procured, and the root weeds more effectually deſtroyed.

When the deſign of plowing is to enlarge the paſture of plants, and deſtroy ſeed-weeds, though a large quantity may be taken off in light ſoil, that naturally falls in pieces when turned over, yet a ſmall quantity ought to be taken off in ſtiff land that is not ſo eaſily reduced; becauſe the ſmaller the quantity is which the plough takes off, the ſoil is the more effectually broken, and the ſurface made the ſmoother; and the more effectually that the mold is broken, and the ſmoother that the ſurface is made, the paſture is the more enlarged and the weeds more effectually deſtroyed. This is agreeable to the ordinary practice, introduced no doubt from experience for we find that a much leſs quantity is taken off when land gets the ſeed-furrow, the chief deſign of which is to enlarge the paſture, than at any other plowing.

In the directions which we have given about plowing, we have had chiefly in our view land employed in tillage; it is neceſſary to add ſomething with reſpect to the plowing lea or opening up graſs-ground.

The Engliſh writers on agriculture, when giving directions about the opening up of graſs-ground, always ſuppoſe that the land is to be ſummer-fallowed; and they recommend to plow as deep at firſt as the nature of the ſoil will allow. They aſſign this reaſon, That it is not poſſible to plow deeper afterwards. They likewiſe direct to turn the earth upſide down

on its back, as we have called it. The reaſon they aſſign this, is, that the ſward or turf may be the ſooner rotten *. Some perſons have tried this method of breaking up graſs round in Scotland, but they found great difficulty in reducing it: and, notwithſtanding the aſſertions of ſome of the engliſh writers, we have reaſon to believe that many find it likewiſe in England: for Mr Tull, in his chapter upon loughs, tells us, That if the turf lye long without being turned, the graſs from the edges will ſpread and form a new turf, and that the roots often ſet up new heads, and the former heads are converted to roots. As Mr Tull's deſign is to ſhow the neceſſity of the four-coultered plough, we need not doubt but he has a little exaggerated the matter; for, upon a narrow inſpection, it will be found, that if the turf is turned upon its back, the graſs will grow only from the ſides. However, we may conclude, from what he ſays, that the land in England is not ſo eaſily reduced in this manner, as ſome of the writers pretend †.

On our rich lands in Scotland, we follow a method the very reverſe of this which has been mentioned. We commonly ſow after one plowing of graſs-ground, and we plow it ſhallow and narrow as poſſible; and alſo ſet the turf as exactly

* This however is not the ordinary method uſed in England; in Scotland they plow ſhallow and narrow in winter, and ſow beans in the ſpring.

† The author of the new ſyſtem of agriculture, in giving directions about the method of breaking up graſs-ground, mentions only three plowings before ſowing with wheat, whether in ſtiff or light land. He propoſes, that the firſt plowing ſhould be begun about the firſt of April, and ended about the middle of June; and that the ſecond ſhould be begun about the middle of June, and finiſhed about the end of July. If the ſecond plowing is begun on the ſame part of the field where the firſt plowing was begun, the turf, he ſays, will be found ſufficiently rotten when it is turned again.

actly as poſſible upon its edge. It is not our buſineſs in this place to conſider the propriety of ſowing after one furrow. We may only obſerve, that if the land is good, a good crop may be expected; and if there is a good crop, the turf will be completely rotten before next ſeaſon. What we have to conſider, is, which is the moſt proper method to break and reduce the turf. May I be allowed to ſay, without giving offence to Improvers, that the Scots method is rather the beſt? It is certain, that the thinner and narrower that the turf is taken off, it is the more eaſily torn aſunder; and the more exactly that it ſtands on its edge, the harrows in going acroſs take the firmer hold, and make the greater impreſſion.

If this kind of graſs ground is plowed before winter, in the manner mentioned, ſhallow and narrow, and the turf ſet upon its edge, it may be expected, if we are favoured with a little froſt, that in the ſpring the turf will be in ſuch a condition, as to be eaſily torn aſunder by the harrows, and the land itſelf in a proper condition to be ſown with oats, or to be fummer-fallowed, and ſown with wheat.

Our barren lands we break up in the ſame manner as recommended by the Engliſh writers, plow deep, and turn the turf over on its back. It ſeems, that the plants which grow on theſe lands, have tougher and ſtronger roots than thoſe that grow on rich lands. This makes it more difficult to break the turf. If the earths of the furrows are ſet on their edge the harrows turn them back, inſtead of tearing them aſunder. This happens whether the land is plowed deep or ſhallow. But when the earths are turned on their back, and the land plowed deep, the harrows raiſe a kind of mold upon the back of the turf, by which the hollows betwixt the earths are filled up, and nouriſhment afforded for the ſeed, the greateſt part of which falls into theſe hollows.

There is another method propoſed for opening up graſs ground, and that is by trench-plowing. This manner of plowing is performed by one plough following another in the ſame

track. The plough that goes firſt, turns over the ſward of turf; and the one that follows, turns up ſome inches of ſoil upon it. By this method there is ſufficient nouriſhment provided for the crop, and the ſward is rotten before next ſeaſon *.

This kind of plowing needs not be confined to the opening up of graſs-ground; it may be uſed in any ſoil that is deep; for by it ſome new ſoil is turned up, and a greater quantity employed in vegetation.

ARTICLE LI.

Deſcription of a farm in England—Profits of a Dairy conſiſting of thirty Cows; method of management, and making cheeſe.

[From a Treatiſe concerning the manner of Fallowing Ground, &c. See N° IV. p. 164. and N° V. p. 218.]

IN ſome places of England, where the commons are of any great extent, the farmers do not improve their ground ſo much in corns, as in breeding of cattle and ſheep, &c. which they ſell, at good advantage, to the ſouthern counties; but all their paſture grounds, except theſe commons, are very well incloſed, and delicately kept and divided, as follows, viz. So much thereof as ſufficiently ſummer-paſtures their cows, which they allow the calf to ſuck two or three weeks; they then fin-

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* The plough that goes firſt ſhould have a feathered ſock, if the land will allow it, and the mold-board ſhould be caſt far outwards above where it is fixed to the leſſer handle. For this kind of ſock is moſt proper for raiſing the ſward; and this kind of mold-board for turning it upon its back. It is neceſſary to add, that where the ſoil is ſhallow, the turf ſhould be taken off as thin as poſſible.

ger-feed them with the milk nine weeks more, and after that weans them, puts them in a good paſture, and makes butter and cheeſe of the milk of their cows.

They allot ſo much of their ground for ſummer-graſſing their old ſheep, ewes, and lambs, which they diſpoſe of when fat; and all their young ſheep or young cattle of two or three years old, paſture all the ſummer in the commons; which they bring in, in the winter time, to paſture on the ground whereon the old ſheep was fed in ſummer; and in any ſtreſs of weather or ſtorm, they bring them into a hain'd incloſure, in the middle whereof the hay that was cut off it ſtands fenced, which, in part, they beſtow upon the ſheep, if the ſtorm continues.

It is obſerved, that they keep as much ground for hay, as maintains all their cows and cattle; and after they take the hay off it, they hain it carefully till a ſtorm come, and then put in their two or three years old and other yeld cattle, to paſture there all winter: and the hay that is generally built and fenced in the middle of the incloſure, is cut down as they have uſe for it, and given to the beaſts alongſt the ſides of the hedges, or where there is moſt bield.

They moſtly keep their cows in houſes in the winter-time, eſpecially if they calve in that ſeaſon: But in Cumberland and Northumberland they let their cows, except ſuch as are to calve, lye out all winter, and feed them with hay, if the place be well incloſed and warm; and ſome keeps them in cloſſes or ſhades at the back of their ſtables, with open tood falds from the wall of the ſtable, wherein racks are placed for their hay; and they feed all their oxen for ſlaughter after the ſame manner. They give them no grain, but good hay, except five or ſix weeks before killing or ſelling, when they give them two, three, or four forpets ſplit beans and oats in a day at ſeveral times, as the cattle are of largeneſs: and it is informed, they give their hay a good heat in the ſtack, till it be reddiſh, of the colour of a tod or fox, which both fattens them

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and they eat it far better than otherwiſe; but the horſes love it well wone and green.

In Biſhoprick and Yorkſhire, they commonly divide their grounds in three parts, viz. corn-ground, paſture-ground, and meadow-ground, which we call hay-ground. For example, a farmer that pays eighty pounds ſterling yearly, will have one hundred acres of ground; ſixty thereof in corn, twenty-five for paſture, and fifteen for meadow; and that corn-ground is again divided into three parts, one third fallowed, and the other two parts for wheat, rye, bear, oats, peas, or beans, according as their ground is in condition; and they are obliged by their tacks, to lay on yearly upon their fallow-ground, all their year's muck, beſides ſo many hundred bolls of lime; and every third year to fallow down again, and repeat the muck and lime: but, in ſome places, they are allowed to take the third crop, and then to fallow down. By thus ſo frequent manuring and reſting their grounds, the produce is conſiderable, ſeldom under the tenth pickle: the lime is ſo far from prejudging the ground, that it enriches it either for corn or graſs.

And in order to give a clearer view, how and in what manner they divide and improve their grounds in Yorkſhire, you ſhall have a particular account given by a farmer in that country, with reſpect to his own management. His poſſeſſion conſiſts of five hundred acres Engliſh meaſure, all incloſed, for which he pays two hundred and twenty pounds ſterling yearly, and he divides it as follows; one hundred acres of laboured ground, two hundred and fifty of paſture, and one hundred and fifty for hay: Of the firſt ground he fallows down yearly about thirty acres, on which he lays his two years dung; for in that country they never lead out the dung of one year's gathering; he plows twenty acres of the reſt for wheat, fifteen for barley, five for rye, and twenty-five for oats; and ſometimes, when the wheat-ground is very ſtrong, in place of barley he ſows beans.

He

He takes three crops at moſt, viz. wheat, barley, oats or beans, and fallows down.

Upon his paſture-ground he keeps ſix horſes and eight oxen for his work, one hundred ewes for lambs, they lamb about the end of February, and ſells off the lambs, except ſuch as do not fatten. *Item*, Fifteen cows, and brings up their young and the queys which he keeps not for his own uſe, are ſpayed and gelded about a month old, and gelds the others at the ſame age. *Item*, Three hundred wedders, which he buys about Martinmas, and winters them in his parks, feeds them with hay in a great ſtorm, and ſells them off in ſummer, after they are fat; he commonly gives for the wedders ten ſhillings ſterling, and he will get for them fifteen, beſides their fleece, and ſeventeen ſhillings when they have the fleece. *Item*, He buys yearly twenty-five oxen at Whitſuntide for fatning on his paſture; ſuch as are not ſold off in the ſummer, are fed upon the fog of the hay grounds with his cows which are never houſed, but foddered without doors upon the paſture; and he allows none of his ſheep the fog either of the cows or of the hay, but remains ſtill in the ſame paſture: ſuch of the oxen as are not ſold in ſummer, are brought in, a month before they be killed, to a houſe thrice a day, to get ſplit beans for fatning them, and at each time about the meaſure of half a peck is given them. He pays for each pair of ſuch oxen twelve or fourteen pounds ſterling, and after they are full fat with graſs, and ſold before Martinmas, he commonly makes fifty ſhillings ſterling profit on each: Theſe he fattens with hay and ſplit beans, and makes five pound ſterling each.

Upon this labouring he keeps only three ſervants, and hires a fourth in plowing-time, ſo that he labours his whole hundred acres with two ploughs, and plows none in the winter ſeaſon; he keeps two women ſervants for milking the cows in the ſummer-time, and in the winter they cut down and give them hay.

Note

Nota, He feeds all his work horſes with good hay, and partly with beans and oats, and beds them with ſtraw; to his work oxen he gives only ſtraw, and beds them with the ſame; they are never houſed, and get their meat in a fold at the back of their ſtables in ſtanding hecks. The dyke of their fold is made of whins as follows: They hold the whins, and lay one whin acroſs another, the root to root, and the tops thereof out on both ſides; when it is a yard or ell high, they put on great ſtones, the broadeſt and heavieſt they can get, and carries it another yard high, and tops it again with ſtones, which is reckoned the warmeſt of any fold, and it will laſt above twenty years, being an ell and a half of thickneſs.

In ſtore countries, where they have great herds of ewes, they drive them all into a cloſs, a little before they lamb, and diſcovers by their uthers, ſuch as are with lamb, and pulls the wool from their uthers, in caſe the wool ſhould hinder the lamb to ſuck; for if the lamb ſhould ſwallow any of the wool, it is certain death to it, which, by experience, they find lying in its ſtomach. When they kill a good lamb for their own uſe, they take it from an old ewe, and takes a lamb from a gimmer that ſhould not had a lamb, and puts it on the old ewe. The method they uſe to make the ewe take with the new lamb, is, they put her in a dark houſe with the lamb, and lets her faſt till ſhe take with it.

It remains now to give you the deſcription of the dairy a gentleman in Cumberland poſſeſſed, of a farm of ſixty pounds a year, upon which he keeps only thirty cows, not above four pounds price*, entirely for milkneſs; and orders it ſo, that they may all calve about the middle of April, ſells off the calves, after ſucking their mothers fifteen days, for ſix ſhillings ſterling the piece: Then he employs all his milk without creaming it, for cheeſe: and ſo careful is he to preſerve the cream for that purpoſe, that he buys butter for the uſe of his family. If his cows fall not to calve the middle or end of April, he diſpoſes

* 1721.

diſpoſes of them, and buys others, calved at that time, to ſupply their place: He gives his cows the beſt of his graſs; never houſes them, but feeds them in his incloſures upon hay all winter: he keeps a man, and four women ſervants for milking them in the ſummer time, and the man ſerves for foddering them in winter. He ſells all his cheeſe to the merchants of Edinburgh and Newcaſtle, at two-pence one farthing Engliſh pound *; and the whey to the poor people in the country for a penny the four Scots pints. He plows no more of his farm than ſerves his family in wheat and bear. *Nota*, He puts no ſalt amongſt the curd; but after the cheeſe comes from the preſs, he puts it in pickle: And his receipt for making cheeſe is as follows:

To make ſteep for your cheeſe, take the maw of a calf new and ſweet, clean it well, and after it is well waſhed, take only the ſkin of it, and ſalt it well, and let it lye three or four days in ſalt, then take it out, and ſtretch it on two ſticks, one croſs the other, and hang it up to dry in a clean part of the kitchen; after it is dry, uſe it as you have occaſion; two inches of it ſquare will ſerve ten cows milk, being ſteeped the night before, and ſqueezed, and will next day ſerve the milk of three or four. Good ſteep is a great art in making cheeſe, therefore follow exactly the above direction.

If your milk be not new come from the cows, warm it just blood-warm without creaming, put it in a ſweet clean veſſel for the purpoſe, then put too the ſteep; and be ſure you give it no more than what will make it come lightly: After it comes, ſtir it with your hand till it be gathered, and that the cheeſe go one way, and the whey another; then take the cheeſe up into a ſtrainer, or cloath made of ſuch as our Duddingſtoun harden; then work it with your hands extreamly well, till you get as much of the whey from it as poſſible; then lay

* This Eſſay was wrote in the year 1721, when every kind of proviſion was at a rate much in proportion to the above price of cheeſe.

it in a clean thin linnen cloath, and put it in your cheeſe fat, or rather a rimmer, which is far better for the ſhape of the cheeſe: the rimmer is juſt an aſh-hoop, which they gird their looms with, without any bottom made of the deepneſs and wideneſs as your cheeſe requires: Then put it to the preſs after it is tightly covered with the linnen-cloath, by laying it in the middle thereof, and fixing it very well, that it may not give way in preſſing; let it ſtand two hours in the preſs, as well preſſed as poſſible: it is then taken out, and the cloth from it; but before you put it in again, rub a little ſalt on it, and obſerve there is no ſalt put in the curd, or in the cheeſe before this time; it is afterwards put in a dry cloath, the one end below, and the other above it: that which is above, you are to ſtop it in as hard as you can about the cheeſe with a wooden knife, and put it to the preſs again; preſs it about eight hours, then take it out, and put it in another dry cloth without ſalt; turn it every time and preſs it a third time, till your next cheeſe be ready; when you take it out, and rubs it with ſalt, as well as if you were ſalting beef; immediately after, wrap the round ring of the cheeſe with a garter made of linnen-yarn, and pin it at the end, which keeps the cheeſe in a good ſhape; and then let it lye in the brime twenty-four hours, which is the ſalt that comes off the cheeſe: Add a little ſalt to your brime every time you put in a new cheeſe, to make it ſtrong; ſo that in a few days the brime will cover the cheeſe: When you find your brime turning unſavoury, make new brime or pickle, turn it in the brime-fat twice in twenty-four hours, and always rub a little ſalt on the top of it; then take it out, and dry it with a cloath; turn it every day in your ſhelf for two months; and till ſuch time as you diſpoſe of your cheeſe, obſerve that your ſhelf-board, and the boards, tables, &c. you afterwards lay your cheeſe upon, be of good thick timber, broader than your cheeſe; and let the garter continue about them five or ſix days, covering the whole ring of the cheeſe.

ARTI-

ARTICLE LII.

An Eſſay on the beſt method of making Butter—On the ma nagement of a Dairy, and ſalting Butter for keeping o exportation.

[From Foreign Eſſays on Agriculture and Arts. Conſiſtin chiefly of the moſt curious Diſcoveries made in the ſeveral Pro vinces of France, Germany, Flanders, Switzerland, &c. an communicated by the learned in thoſe countries for the improv ment of Britiſh Huſbandry.]

A Conſiderable trade for butter being carried on in France not only for the ſupply of the great towns in the king dom, but alſo for the uſe of the colonies, it is natural that w ſhould contribute as much as poſſible to the perfection of thi commodity; and this ſubject appeared to be of ſo much th more importance, as Normandy is capable of ſupplying a ver conſiderable quantity of the beſt butter, for it abounds wit excellent paſtures, which maintain a great number of mil cows.

All the inhabitants of Normandy know the defects of th butter they make, but few of them are ſenſible that theſe de fects are leſs to be attributed to the quality of their milk, tha to the manner in which they manage their dairies.

One ſingle diſtrict is well ſkilled in this matter, and n other has benefited by its example in the courſe of a gre number of years.

By adopting the method practiſed in the country of Bra which I am now about to deſcribe, our butter would be del cious and good at every ſeaſon of the year; it would becom a capital article of houſewifery, as it would be proper for ſal ing, and would keep for years together: by this means might become an article of commerce, in preference to bu ter made in a different manner, and ſave large ſums of mone to the kingdom, which are now ſent abroad to purchaſe th commodity, though of an inferior quality.

Obſervatio

Obſervations made at Merval, on the manner of making Butter in the country of Bray.

The milk is ſet in cellars arched over with brickwork, deep and cool, ſomewhat reſembling ſuch vaults as are beſt adapted to keeping wine in proper order. The temperature of the air in them, in winter as well as ſummer, is nearly from eight to ten degrees of M. Reaumur's Thermometer. They are paved with ordinary tiles, or ſimply with bricks laid flat.

When there is any reaſon to apprehend the heat penetrating into the cellars, the vent-holes are ſtopped with ſtraw during the heat of the day.

In winter they take care that the cold ſhould not get into this cellar, by ſtopping the vent-holes in like manner in froſty weather.

The door to theſe cellars, and the vent-holes ſhould be either on the north or weſt ſide; the door is often within the dwelling-houſe, but always in a room where no fire is kept.

Neatneſs and cleanlineſs are ſo very eſſential in this cellar, that no wooden uteuſils, boards, &c. are ſuffered to be in it; becauſe as theſe would ſoon rot in ſuch a cool place, a diſagreeable and muſty ſmell would iſſue from them.

Not the leaſt dirt is to be ſeen either on the roof, the edges of the air-holes, or on the floor; and in order to preſerve this neatneſs, the pavement is frequently waſhed; and no-body comes in without putting on a pair of ſlippers, which ſtand ready at the door.

The perſons who have the care of the dairy put them on here, firſt pulling off their ordinary ſhoes; the leaſt ſmell, other than that of milk, which ſhould be perceived in the dairy, would be thought to injure the quality of the butter, and would be attributed to the want of care in the maids.

Cleanlineſs is thought ſo extreamly neceſſary towards the having good butter, that in Saxony and Bavaria, they rub

and waſh the cows before they milk them, if they happen to have lain down in the cow-houſe.

The keelers in which the new milk is put, are earthen diſhes ſcolded in hot water, in order to get off the ſtale milk that may be ſoaked into their ſubſtance. This ſtale milk is an inviſible leaven, though well known, which ſours the new milk. Conſtant experience has diſcovered this inconvenience. Theſe diſhes are fifteen inches wide at the top, ſix at the bottom, and ſix inches deep. Theſe dimenſions are from outſide to outſide; if they were deeper it would be hurtful, if they were wider it would be inconvenient.

The milk is brought from the paſtures in the wooden pails or earthen pans, in which it was milked.

All copper veſſels are eſteemed dangerous to be uſed in a dairy. The milk is ſuffered to remain quiet about an hour on the dairy floor, till the froth is gone off, and the natural heat it had has quitted it. It is then poured into the diſhes through a ſieve, ſo that no cow hairs or dirt may remain in it.

The diſhes are ſet on the floor of the dairy, after it has been well cleaned; the coolneſs of the place communicates itſelf to the diſhes, and prevents the milk from curdling; for every thing that is done in the dairy, is in order to hinder the milk from curdling and growing ſour in ſummer before the cream is taken off; and in the winter to prevent the dairy from being ſo cold, as that the milk ſhould be frozen, or that the butter ſhould be with difficulty made, on account of the cream having been chilled.

The diſhes being in this manner filled, are twenty-four hours, and ſometimes leſs on the dairy floor; they are then ſkimmed; they ſhould not be left longer, becauſe the cream would loſe it ſweetneſs, becoming thick, and the milk until it might curdle and grow ſour; and where this is the caſe, no good butter can be expected.

The ſkimming is performed in the following manner.

The maid gently raiſes the diſh, laying the lip of it on

arge pan, and with her finger's end, ſhe divides the cream near the lip of the diſh, in ſuch a manner, that the milk which is underneath, may be poured off into the great pan through this diviſion, leaving the cream by itſelf in the diſh.

All the diſhes which were ſet at the ſame time, are in this manner at the ſame time emptied, and all the cream is put together in proper pans, in order to be churned at the appointed hour.

At the time of the year when it is neceſſary to milk the cows three times a day, this work is to be three times a day repeated, when the milk has been ſet in the diſhes twenty-four hours.

It is neceſſary to obſerve, that the diſhes being only ſix inches deep, the cream riſes much ſooner to the ſuperfices, and is generally all riſen in about eighteen or twenty hours, particularly when the coolneſs of the air in the dairy prevents the milk from curdling.

If the weather is tempeſtuous, very hot, or inclines to thunder, the cream riſes a great pace, and the milk will quickly curdle and grow ſower, but this muſt be prevented thus; as ſoon as the dairy maid hears the thunder at a diſtance, ſhe runs to the dairy, ſtops up the vent holes, cools the pavement by throwing down ſome water, and then ſkims all the diſhes wherein the cream has riſen a little.

In ſome extraordinary caſes, the cream riſes in leſs than twelve hours.

When the milk is thus drawn off from beneath the cream by ſtooping the diſhes, within the ſpace of twenty-four hours at fartheſt, the butter milk which is in the cream is not in the leaſt ſour, and the ſame may be ſaid of the ſkimmed milk. This laſt being then a very thin liquid, no part of it remains in the cream, ſo that there will be no danger of the cream ſouring in four or five days, whilſt it is kept in the dairy before it is churned.

They

They who are acquainted with the manner in which dairies are managed in Upper and Lower Normandy, may eaſily judge that their diſhes, which are above as large again as thoſe made uſe of in the country of Bray, cannot be cooled like theſe latter; that the cuſtom they have of pouring the warm milk into them, abſolutely defeats the intention of keeping them cool; that the cream cannot riſe to the ſurface of theſe large diſhes, ſo quickly as to be taken off before the milk beneath is ſour; that the cuſtom of leaving theſe large diſhes expoſed to all varieties of heat and cold, though either may be in extreme, without taking the leaſt care to guard againſt the natural bad ſmell, or dirtineſs of the place, are ſtill more oppoſite to what ought to be done; and finally, that to leave the milk to grow ſour and curdle, ſkimming it only once in five, ſix, or even eight days, and ſometimes more, are cuſtoms which tend to ſpoil both the milk and the cream, inſomuch that no good conſequences can reſult from them.

Common experience convinces us, that the acid parts deſtroy thoſe which are more fat, and of greater ſubſtance, and that they give the conſiſtence of ſoap, to what they do not reduce to water: it is alſo well known in the country of Bray, that the cream taken off whilſt it is light, new, and ſweet, from milk that is alſo ſweet, yields a larger quantity of butter, in proportion, than when it is taken off ſtale, from curded, ſour, old milk; the butter in this laſt caſe, is not only in ſmaller quantity, but it is more rank, cannot be kept freſh, and is by no means proper for ſalting, which is the principal object of this eſſay.

I know ſeveral diſtricts in this province (Normandy) where the butter is good and fine flavoured in ſpring and autumn, but rank and bad in ſummer, becauſe the coolneſs of the ſpring and autumn has nearly the ſame effect on their dairies, as the inhabitants of the country of Bray, induſtriouſly endeavour to cauſe the whole year round. But when the ſummer advances,

vances, the fourneſs of the milk ſpoils the butter, and makes of no value, though their paſtures are excellent.

We may reaſonably conclude, that if they had better management, they would not loſe the advantages they might turally expect from the fine weather of the ſummer, when e graſs is infinitely better and more plentiful.

I know a farm, the chief profit of which ariſes from butter; is farm, when occupied by intelligent and ſenſible people, elded butter which ſold for the ſame price, as the beſt made the country of Bray; the land, however, coming into the nds of a farmer who knew but little of this matter, and oſe wife was full fraught with the prepoſſeſſions ſhe had rnt in the country of Caux, and which ſhe exactly follow- during the nine years of the leaſe, the butter made in that ne was conſtantly ſold for the worſt ſort, at a third part leſs ice than his neighbours, and neither the remonſtrances of e landlord, nor the loſs ſhe every week ſuffered, could ever rſuade this woman to alter her method.

For eight years paſt, this ſame farm has been in the hands a new tenant, an induſtrious intelligent man, who adopting od methods, the butter he made was immediately eſteem- the beſt in the country, and is conſtantly ſold at a price cordingly, in the market of Gournay.

To this farmer am I obliged, for the deſcription of the management of a dairy which I am now giving.

This anecdote proves, that the advantage of this method no means depends on the ſoil, though it be ever ſo good.

All the milk that is ſkimmed, muſt immediately be taken of the dairy, leſt it ſhould in any way injure the cream, this latter is kept four or five days, or even a week, before churned; but it is at the ſame time to be obſerved, t the leſs time the cream is kept, the finer flavoured will be butter that is made of it.

In extenſive farms, where the quantity of cream is too large be managed in common churns, they uſe a barrel churn.

One

One of theſe conſiſts of a barrel about three feet long, and two feet and one half in its largeſt diameter, the whole meaſured from out to out. On each head is an iron ſpindle, faſtened on with a croſs to the head, and on each ſpindle is a winch.

The ſpindles reſt on a horſe or ſtand, made on purpoſe of ſuch a height that the women may eaſily turn the churn.

The iron croſſes by which the ſpindles are faſtened to the heads of the barrel, prevent their being any neceſſity of an axis paſſing through it, as there muſt be no iron within ſide the barrel. The winches are made three feet long, that two or even three people may work at each, when the quantity of butter in the churn requires it.

Within the barrel are two boards, faſtened edgeways, one on each ſide the aparture hereafter mentioned, to the ſtaves and running the length of the barrel on that edge, but on the other edge they are chamfered off at the ends, in order to permit the liquid part to paſs eaſily whilſt the churn is turning.

One hundred pounds of butter at a time may be made in a churn of this ſize; there are larger, and ſome on the contrary are leſs; in other reſpects, it is not much matter in what inſtruments the butter is made, provided there is no intermiſſion in the making. The barrel churn is uſed for greater expedition, where a large quantity of butter is made at a time, and any inſtrument that will accompliſh this end, may indiſcriminately be made uſe of.

The cream being put into the churn, the aperture which ſhould be at leaſt ſix inches wide, is to be cloſed with a plug covered with linnen dipped in a lye, which I ſhall deſcribe by and by, and ſecured by an iron bar. Over the bar paſſes an iron pin, which being driven into two ſtaples faſtened to the barrel, makes every thing ſecure.

Four or ſix people turn the churn, till the butter is made, which will be in one hour in ſummer, but in winter will require ſeveral hours; this work does not coſt much, for the farmer

farmer's maids are helped by ſome poor women in the neighbourhood, who have only a little butter-milk given them for their trouble.

It is very evident, that the motion of the churn continually agitates the cream, for every turn it falls twice from one board to the other, and they know when the butter is made, by its falling in a lump. The butter-milk is then drawn off through a hole about an inch diameter, on one ſide the large aperture, which hole had, during the operation, been ſtopped by a wooden plug.

Through this hole a pail of cold water is poured, by means of a funnel, and the plug being again put in, they continue turning the churn, to waſh and cool the butter. This work is three times repeated, if they would have it well cleaned, and it is left ſeveral hours to cool in the laſt water, that it may be the firmer, if the weather is very hot.

When the butter is ſufficiently cooled, the great plug is pulled out, and the butter is taken with the hand from the churn, in pieces of two or three pounds weight each, of which lumps of different weights are made, to fifty pounds, by heaping it in a cloth purpoſely dipped in lye.

The largeſt lumps are moſt eſteemed, becauſe they keep better in carriage.

They mark the lumps with wooden ſpoons, and notched ſticks, in order to decorate them.

In winter, butter having no colour, the natural paleneſs of it is diſagreeable to the ſeller, to the buyer, and much more ſo to the conſumer.

They have diſcovered a method of giving it the colour that is natural to it in ſummer, without injuring the quality of the butter, or infecting it with any taſte whatever.

They get a large quantity of Marygold flowers; either double or ſingle are equally good, provided they are freſh gathered.

Theſe

Theſe are put into a ſtone pot as faſt as they are gathered and being preſſed down, the pot is covered and ſet into the dairy.

After ſome months, all theſe flowers are converted into a thick liquid, of the colour of a Marygold flower; this liquid they uſe in winter, to colour their butter; they mix a ſmall quantity of it with ſome cream, which they put into the churn when they fill it.

Experience teaches them to put the neceſſary quantity, according to the fulneſs of the colour they would give the butter.

This colour is laſting, for the butter never loſes it. Marygold flowers, which give it no bad quality, are known to be alexipharmic and ſudorific, but the ſmall quantity that is put into butter, has no ſenſible effect.

Of the neatneſs and cleanlineſs required in making Butter.

Butter is not only apt to ſtick to what is not very clean, but alſo to every thing that has been waſhed well, or even ſcalded with hot water, if it is not firſt rinſed with lye, made of fine aſhes, or of Roman nettles bruiſed till they no longer ſting; the laſt are generally uſed, and every time a pan, cloth or other utenſil, has been employed in the dairy, either for holding milk, cream, or butter, they ſhould be rinſed in this lye, before they are again uſed: and moreover, the miſtreſs who is generally the perſon that makes up the butter, and takes it out of the churn, is obliged to rub her hands and arms with this lye, or the butter would ſtick to them.

Of the Uſes to which the Skimmed Milk, Butter Milk, &c. are applied.

The poorer kind of people drink the butter-milk, which is taken out of the churn, by way of food; they alſo make broth of it in the farmer's houſe for the men and maids, and moiſten bran with it to feed the poultry, &c.

The

The ſkimmed milk they give to their calves, warm, mixing half water with it. This milk being very thin in body, as the more ſubſtantial and nouriſhing part is taken away from it, often gives the calves a weakneſs, of which ſeveral formerly died; but they are preſently recovered, by letting them ſuckle their mothers, which ſoon reſtores them to their ſtrength and vigour. This remedy is, however, expenſive, as it deprives the farmer of the butter, which would be produced by the cows milk.

They ſay, that if the ſkimmed milk was half-mixed with water, in which turneps, parſneps, or any ſweet and nouriſhing roots had been boiled, the animals, ſo far from contracting a weakneſs, will grow fat, the juice of theſe plants in ſome ſort, ſupplying the place of the fat parts of the milk which are taken away

I am of opinion, this method might without any riſk be tried; but it is neceſſary to take notice to the country people, that in general, they uſe copper veſſels to heat the milk which they give to their calves; the copper of theſe veſſels depoſits in this milk, which is naturally inclined to be ſour on account of its being deprived of its more oily parts, a corroſive quality, capable of injuring young calves, and even killing them. It would be much ſafer, if earthen veſſels or iron pots were uſed, as theſe communicate no bad qualities.

As to ſuch of the ſkimmed milk as the calves do not conſume, it is curdled by art as ſpeedily as poſſible, leſt it ſhould turn ſour; ordinary cheeſes are made of it, which are uſed in the farmer's own family, or ſold to the poor; finally, the whey which is preſſed out of theſe cheeſes, with the ſkimmed milk that is not applied to this uſe, ſerves to feed the pigs withal.

Of the method of ſalting Butter.

Our endeavours ſhould tend towards making butter fit for ſalting, as by that means it may become an object of commerce, either in the interior parts of the kingdom, the other

countries of Europe; or, finally, for the parts beyond the tropic.

The method we have deſcribed gives to butter the qualities neceſſary for its preſervation, but it muſt be ſalted enough to make it keep, which depends on the quality and the quantity of ſalt that is uſed, the veſſels in which the ſalted butter is put, and ſome other circumſtances.

The farmers, not being accuſtomed to ſell their butter ready ſalted, they carry it to the markets of ſuch towns where there is the greateſt conſumption: there every one buys the quantity of butter that is neceſſary for his family. The buyer diſtinguiſhes that which has the qualities of the butter made in the country of Bray, from that made in the manner of the country of Caux; he ſets a value on one and rejects the other, which is ſpent freſh in the neighbourhood where it is made.

Butter ſhould be ſalted as ſpeedily as poſſible, every delay being prejudicial. It is ſeveral times to be waſhed till the water is no longer diſcoloured. Grey or bay ſalt ſhould be uſed, and not white ſalt, which is not eſteemed good for preſerving any thing.

The bay ſalt is to be dried in an oven and bruiſed; the waſhed butter being then ſpread out, an ounce of the dried and bruiſed ſalt ſhould be ſprinkled on for every pound of butter: it ſhould then be kneded till the ſalt and the butter are well incorporated together.

The ſalted butter is afterwards put down into ſtone crocks or jars of various forms. The jars ſhould firſt be ſcalded with boiling water, to get out the ſtale butter which ſoaks into the pores of the earth of which they are made, they are then to be rinſed with lye, in the manner above preſcribed for the dairy utenſils.

Theſe jars hold from twenty to thirty pounds; the ſalted butter is to be preſſed down in the jars, and they are to be filled within two inches of the top, after which they are to remain quiet for ſeven or eight days.

In

In this time the ſalted butter detaches itſelf from the jar by ſhrinking in its ſize, and leaves between it and the jar a ſpace of about a line wide, into which the air would inſinuate itſelf, and ſpoil the butter if it was ſuffered to remain in that ſtate.

In order to prevent this, a brine is prepared, made of ſalt and common water, which muſt be ſtrong enough to bear an egg, as there would be danger in making it too weak.

This brine being ſettled, the clear part is drawn off, and is poured on the ſalted butter, ſo as to introduce itſelf into the vacant ſpace between the butter and the jar, and thence expel the air as faſt as it gains admittance; for this purpoſe it is poured on by little and little, gently moving the jar, till the brine is at leaſt an inch above the butter. The air cannot, after this is done, approach it on any ſide, unleſs the butter floats in the brine. In this caſe a weight muſt be laid on it, in order to ſink it, and thereby prevent the air from cauſing it to decay.

This is the method of ſalting butter, which we practiſe all the year round at Rouen: It is uſed in the beſt families, and ſerves to make paſtry, which the moſt delicate palates cannot but approve of.

All butter ſalted in this manner, and put down in ſtone jars, with a ſufficient quantity of brine, will be equally good with that of the country of Bray, which we have deſcribed; for the keeping well of the butter depends on its not having been injured by the acidity of the ſour milk, and on the jar being made of good earth, and its being well ſcalded and rinſed, as we have recommended, with the lye, ſo as not to communicate any bad quality to the butter.

When this commodity is to be carried to any diſtance, the brine cannot be kept in the jars; to ſupply the place of it therefore, they cover the butter with ſalt to the thickneſs of an inch.

This method does very well, provided the butter is not long without brine; inſomuch that butter, properly made, and which after being ſalted, is carried into the ſeveral parts of Normandy,

Normandy, and even to Paris, if brime is but put on it when it comes there, will be very good.

But this will not do for butter intended for exportation or ſhips proviſions. It is very difficult to ſtow any conſiderable number of jars on account of their being ſubject to break; hence came the cuſtom of putting up butter in firkins or tubs: but whether it is put into firkins or jars, it is impoſſible to keep it covered with brine if the ſhip paſſes the tropic.

In order to remedy theſe inconveniences it will be proper to ſeaſon the wood, of which the butter tubs are made, to keep it from ſhrinking, and from the fermentation to which it is ſubject in hot climates, when the tubs are greatly heated in the hold, at which time the ſap ouſes from the wood, mixes with the butter, and makes it rank, notwithſtanding it has been well ſalted. The ſame fermentation alſo leſſening the volume of the ſtaves, the brine runs out, and the butter is ſoon ſpoiled.

It is not impoſſible to find a remedy for this, and to do it would certainly be of infinite uſe, as it would probably be a means of making all ſorts of ſea proviſions keep better, which would greatly contribute to preſerving the life and health of ſailors, an object of no ſmall importance.

In order to preſerve butter on ſhipboard, it ſhould be well put down in jars, ſhaped like a fruſtrated cone, the baſe uppermoſt, or rather like a perfect cone, the baſe uppermoſt, out of which the butter might eaſily be taken in a ſingle lump.

The lump of butter being covered on the outſide with ſalt, and then preſſed down into its jar, might in this condition do without brine, becauſe the jars reſting on the point of the cone, the lump of butter would ſink towards the bottom as faſt as the ſize of it might be leſſened by the heat of the hold; by this means there would never be any vacant ſpace, except on the top, which ſhould be covered with ſalt.

Wooden tubs might be made in the ſame form, ſo as to anſwer the ſame purpoſe, provided the wood they were made of

f was well ſeaſoned; but the greateſt pity is, that theſe tubs ould not be conveniently ſtowed in a hold.

In general the paſturage of the greateſt part of Normandy eems to ſurpaſs that of the country of Bray, if we may be ermitted to judge by the nature of the ſoil, and the dung hat is left by grazing animals.

If any means could be diſcovered, by ſome encouragements iven, of introducing a good method of making butter into uch parts as now make ſo wretchedly bad, the ſalt butter hich comes to Rouen from Iſigny, and other parts of Nor-andy, would not be entirely abandoned to the conſumption f the poor.

If this was the caſe we may preſume, that butter would be-ome a capital object in commerce, greatly to the advantage f thoſe who poſſeſs extenſive paſtures; for even at this time, here is not a cow but what brings forty ſhillings clear profit o its owner, after all expences are paid, putting entirely out f the queſtion the great encreaſe of profit that might be ex-ected from dealing in butter of a ſuperior quality, fatting alves, and even the cows.

It is well known, that fattening oxen does not bring ſo large profit to the graziers by far; whence we may conclude, that would be very advantageous to farmers if they kept more ilk cows.

This advantage would ſubſiſt till the quantity of butter ade was in proportion to the demand; and even afterwards would always continue a capital branch in agriculture, as it ould keep us from the neceſſity we now are under of purcha-ng ſuch quantities of foreign butter.

I have been by ſo many perſons requeſted to write this eſ-y, and by ſuch as are ſeemingly eager to adopt the methods reſcribed in it, that I am in hopes its utility will in time be lt not only by the dairy-man, but alſo by the farmer and the nd-owner.

ARTI-

ARTICLE LIII.

On the Culture of Parſneps in the open Field, as food for Cattle.

[From Foreign Eſſays on Agriculture and Arts, &c.]

PARSNEPS are cultivated as food for cattle in ſeveral parts of the province of Bretagne, but as this uſeful practice is not yet ſufficiently extended, it may not be improper to treat, in this place, of their culture in the open field.

For this purpoſe, we cannot have a better guide than M. L. Brigant, who has taken the trouble of writing ſeveral letters to us on the ſubject, with which experience has made him very converſant.

Parſneps ſhould be ſown on land which has been dunged the preceeding year, and they ſucceed particularly well after barley. The land ſhould be deep plowed, and brought into good tilth.

Whilſt the plough is at work, there ſhould be a number of men provided with ſpades or ſhovels, whoſe buſineſs is to clear the earth from the bottom of the furrow, and caſt it on the ridge the plough has turned.

The whole field is to be thrown into lands ten or twelve feet wide, and between every two lands a trench ſhould be dug, the workmen throwing the earth that comes out of it on the lands on each ſide.

If any ſmall clods are ſtill remaining, they are to be broke with a rake, and the whole ſurface laid as level as poſſible, except that the lands are to have an eaſy ſlope on each ſide towards the trenches.

The earlieſt time of ſowing the ſeed ſhould be the latter end of February; and the lateſt, the end of March.

The ſeed is covered by briſkly raking the land.

It is cuſtomary to ſow with them, at the ſame time, Windſor beans; and to plant cabbages on the edges of the lands.

The parſneps muſt by all means be ſown very thin, and if in ome ſpots they ſhould come up too thick, a part of them muſt e drawn.

As ſoon as the weeds begin to make their appearance, they uſt be carefully hoed and weeded; which work ſhould be ore than once repeated.

The parſneps may be taken up the end of October, but it much better to wait till the end of November. They are aken up either with a ſhovel or a ſpade.

When they are all out of the ground, they are cloſely iled in a dry place, in order to their being kept a long time.

Parſneps are very uſeful to feed, and even fatten all ſorts of attle. Horſes, oxen, cows, and hogs, are all equally fond of is nouriſhing root.

The parſneps are at firſt given to them raw, either cut in ices, or ſlit their whole length into quarters.

As ſoon as ever the cattle ſeem to diſreliſh them, the par- eps muſt be cut into ſlices, and put into a chauldron or pper, in which they are to be preſſed down as cloſs as poſſible.

When this is done, ſome water is poured into the veſſel, fill up the cavities, and the whole is boiled.

In this ſtate the cattle will eat them with aſtoniſhing greedi- ſs, and are ſure no more to take a diſreliſh to them.

The hogs in Bretagne have no other food in the winter ſea- n; and when fodder is ſcarce, the cows there eat nothing but arſneps.

With reſpect to horſes, ſome people ſay parſneps make them ggiſh, and withal ſo nice, that they will rather ſtarve than terwards eat any other food. It is alſo aſſerted, that they ut the eyes of horſes, and make their legs ſwell.

From the reſult of M. Le Brigant's experience we find, at a field ſown with parſneps yields three times as much pro- as the ſame field would have yielded had it been ſown with eat; yet wheat one year with another, in the diſtrict where s gentleman lives, yields a return of nine for one.

We

We muſt alſo obſerve, that the field produces beſides, th
ſame year, a crop of cabbages, and another of Windſ
beans; and that the land is in excellent order to bear, the e
ſuing year, a crop of wheat, or even of flax.

Such conſiderable advantages would induce us generally
recommend the culture of parſneps, but for an obſervati
M. le Brigant makes, on the nature of the ſoil in his pariſh.

He ſays, they have very little clay there, the ſoil being n
ther ſtiff nor moiſt, but ſtony and light; and that the farth
you go from the ſea, the leſs proper the land is for parſneps.

It would be of univerſal advantage, were ſome careful
periments made, to try whether parſneps might not to pr
be raiſed on a ſtiff loam.

It were to be wiſhed, that this root was equally well adap
to thrive in every ſoil, as it ſupplies all ſorts of cattle w
plenty of very wholeſome food during the winter months.

This, joined to the artificial graſſes, which yield plenty
green fodder by the latter end of April, or, at fartheſt, by
beginning of May, would ſerve to maintain numerous he
of cattle through the whole year.

Experience continually convinces us, that the farmers
fer great loſſes amongſt their cattle, for want of fodder, w
a dry ſpring happens to hinder the natural graſs from ſpri
ing. They are then obliged often to ſell at a low price
cattle which they are no longer able to feed. This is a
injury to their crops, as the quantity of dung muſt of
ceſſity be decreaſed.

For theſe reaſons, we cannot be too much attentive to
ing of artificial graſſes, and the raiſing ſuch crops as w
ſupply our cattle with plenty of food during the winter ſeaſ

To have numerous herds of cattle is certainly of great
nefit to every kingdom; and indeed, if we would have l
crops of corn, they are abſolutely neceſſary.

Take care of your cattle, and agriculture will be ſur
flouriſh in all its branches.

A R

ARTICLE LIV.

Of the Improvement of the Scots Agriculture.

[In a letter to the Publiſher.]

YOUR profeſt deſign in this publication is, to do good: I hope it will have that effect: There is much need for it: And perhaps I may occaſionally contribute my mite for that purpoſe; though I ſhall not be frequent, nor tedious in my correſpondence.

At preſent, my intention is more for information to myſelf and others, from you or your correſpondents, than to give it; though a thorough knowledge of the diſeaſe, is no bad means towards finding a remedy.

The generality of our people dependent on huſbandry, which comprehends great numbers, including ſmall tenants, croſters, graſs-men, &c. under various local denominations, in many or moſt parts of Scotland, the Highlands included, are almoſt all labourers; conſequently nine tenths of the people, who have relation to huſbandry, are certainly in a lamentable condition at preſent, from a ſucceſſion of bad crops; proceeding, it is to be hoped, from bad management, more than from unfavourable ſeaſons, or any local unfavourable circumſtances; therefore in our power to find ſome remedy.

Moſt of the above mentioned people are poor, and cannot, without great diſtreſs, bear high prices of grain, and ſcarcity of forage for one year, and far leſs for ſeveral ſucceſſive years, as have lately occurred, with the conſequential mortality of ſheep and cattle; and become thereby great objects of compaſſion, and require the moſt ſerious attention and ſtudy for their relief.

There is, in moſt parts of Scotland, a diſtinction kept up of land, capable and in uſe of culture, or *infield* or *intown*, as

it is called, and *outfield*: both badly and unſucceſsfully uſed by an unhappy general inclination and practice in the people to plow and ſow every thing they can; when certainly they do not reap as much as to pay their labour, and ſubſiſt themſelves and beſtial. The perpetual culture, and bad manuring and tillage, of their intown produces more weeds than grain which by theſe weeds is robbed of its nouriſhment; and having no graſs that merits the name, upon either intown or outfield, muſt, if the practice continues, ſtarve both the people and beſtial, and perpetuate their miſery. Therefore I wiſh to know, what plan can be ſuggeſted to obviate this unhappy ſituation of ſuch great numbers; a thing in which proprietors are highly intereſted; for the encreaſe of rents ought, and muſt depend upon, and be proportioned to the circumſtances of the tenants, and the probable produce of the lands.

Whether a total abolition of this diſtinction of the lands and introducing a new ſyſtem among them, whereby the whole ground may undergo a regular rotation of crops of corn and graſs, or a proper plan for each ſort, will beſt anſwer the end, I leave to you and correſpondents to think of. I ſhall not at preſent give any poſitive opinion upon it; but it is an object of great concern to the country, and worthy of every benevolent mind to contemplate and promote.

It is evident, that the preſent manner of proceeding is bad, and equally ſo, that meliorating crops of turnips, potatoes, curled-kail which ſtands froſt, and graſs-ſeeds, after ſuch preparation, practiſed in proper proportions, according to the quantity of land each poſſeſſor holds, may furniſh more ample and ſucceſſive food for men and beaſts, while it cleans the ſoil and improves the pooreſt lands, and the tenant will not the labour without proper returns, and a due reward.

May not the expence of the labour alſo be much leſſened by introducing the more frequent uſe of cattle for the plough and the draught, [N° II. p. 56. and N° III p. 113.] which after they are worn out, can be fed and ſold to the ſhambles

which

which is not the caſe with old horſes, which are of no uſe but for the dog kennel; or by introducing better horſes, which, though more expenſive in the original purchaſe, yet fewer will ſerve in the draught; and fewer likewiſe for the plough, if our farmers will only be induced to try two in the plough without a driver, which is already practiſed in ſeveral parts of Scotland with ſucceſs; whereby there is not only a ſaving in a ſupernumerary ſervant, but alſo in the grain and graſs for feeding, and in the ſhoeing, harneſs, and attendance. For ſaving is ſureſt gain: a penny ſaved is a penny gained; and much certainly may be ſaved, if our farmers will carry œconomy through all their operations.

Towards the propoſed relief to ſuch great numbers, and indeed evident benefit to gentlemen of property, it would be proper to conſider alſo, how in the cheapeſt and beſt manner to cultivate waſte or new lands of different ſtaples, and in various circumſtances of climates, accommodation of manures natural or by dungs, ſea-ware, or water; which would comprehend the Highlands eaſt and weſt, in which turfing, with the manner and expence of it, would probably be introduced; alſo, all means for manure or compound dunghills, by proper mixture of earths, all or what vegetables, even heather, whins, broom, and croppings of trees, and almoſt all theſe various ways, how each may be uſefully employed.

To the cold, ariſing from the general nakedneſs and bleakneſs of our country, is often aſcribed our bad crops of grain and graſs; therefore incloſing and ſhelter becomes objects of remedy. May not whins for hedges, in two or three rows, be much cheaper and quicker for fences than any other, and contribute thereto; and when yearly or alternately cropt and bruiſed, ſerve alſo for much winter green forage; all beſtial being certainly fonder of them than any thing elſe in winter, and cheaper and more ſpirited than hay? and why not plant belts of trees, ſeveral rows in ſtrips where land is not very valuable, with two faces to defend them in place of a dike

dike; or even broom for ſhelter on poor lands or waſtes, as it will grow any where. Many ſuch remedies and ſalutary ſuggeſtions may occur, upon deliberate conſideration of ſagacious perſons. I have not leiſure at preſent to be more particular. I wiſh ſucceſs to your good intention.

Inverneſs, April 24. 1773. PRO PATRIA.

P. S. A worthy gentleman told me, he practiſed, with ſucceſs, rolling down the ſecond or third growth of his red clover, to lie all winter to warm and manure the land, and plowed it in the ſpring for Spring-wheat, a ſort from Switzerland, which ripened, though only ſown in April, before his oats, and yielded a good crop. He had a good crop of peaſe after the wheat, and oats after the peaſe. I wiſh to know how that practice, as to clover, wheat, peaſe, and oats, hath anſwered upon practice with others, and of the quantity of wheat produced *per* acre, with its weight *per* boll. And *quere*, Why conſtantly ſo much oats, which require better land than rye, and are more ſcourging to the land, though they do not yield near ſo much meal or ſpirit, nor are ſo nouriſhing? And what is the beſt way to propagate rye, or to uſe it in bread, by itſelf, or mixed, and with what?

ARTICLE LV.

A propoſal for the Improvement of Farming in Buchan

[In a Letter to the Publiſher.]

I Have read all the Numbers of your well intended Pamphlet, and am glad to find a ſpirit of improvement in Farming taking place in the South country, and waited to ſee ſome of my brethren in the North, publiſh their opinion of the ſtate of Farming here, which I am afraid will be found to be in gene-

al; eſpecially among the common farmers, in a much leſs flou-
ſhing condition, as well as leſs underſtood, than in the South
ountry. Some obvious reaſons of the unimproved condition
f this country I am well appriſed of, which are not likely to
e removed, as long as landlords ſtudy more their own imme-
iate profit than the advantage of their ſucceſſors, and im-
rovement of their lands. For it is certain, that the old me-
hods will ſtill be followed, unleſs gentlemen be at more
ains to find out and encourage farmers of ſpirit and induſtry
o cultivate their eſtates, whoſe intereſt muſt be conſidered as
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s a kind of inheritance: Without this no man of ſpirit will
e found to ſettle on a particular ſpot, and ſet about improve-
ents with induſtry and application, when he does not know
ut the profits of all his labour may be enjoyed by an ungrate-
l landlord; while his own ſon is obliged, either to purchaſe
em at an extravagant price, or begin on a new ſpot, or leave
s country.

As I poſſeſs a farm not far from the coaſt-ſide, I have made
me obſervations on the farmers there, as well as on muir-
nd farms, which have no acceſs to the ſea-ware; and theſe
ſtick obſervations are ſent, in compliance with your general
vitation to farmers, if you think proper to give them a place
your uſeful publication. And, *firſt*, As to the coaſt-ſide
rmers; it is my opinion they take very unprofitable methods,
take them in general: Every one in proportion that will
w about thirty bolls of grain, keeps fifteen horſes, beſides
o or three idle ones, and every ſix horſes require a man and
boy; here are at leaſt four men ſervants. They generally
ep their whole poſſeſſion under tillage, and have no other
od for their horſes but thiſtles which they gather from the
rn fields. This employs the ſervants all the time the horſes
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e to ſee them teathered on the ſide of the high-way, without
a green

a green herb in their power, except what they get from the ha
of the ſervant, and the bones cutting the ſkin for leanne
To be ſure this is not every body's method, but in general it
ſo on the coaſt-ſide. By this means, I believe, at a reaſonab
calculation, they loſe a ſet of horſes every five or ſix years;
they ſeldom eſcape mortal diſeaſes, owing to their hard wo
and low feeding. Now, my method of managing that thi
acres or ſo, would be as follows: 1*ſt*, I would only keep fo
horſes and two ſervants. I would keep a third part in gra
which I would ſea-ware in the end of ſummer, before I
boured it, (always keeping it at leaſt three years in graſs), a
lay it down the third crop with bear and ware, or the fou
year will do very well. Thus I have twenty acres, one h
in grain, the other in graſs; each relieving the other; an
maintain, that my ten acres in grain ſhall yield more by a gr
deal than all their twenty acres, ſo that I have ten acres
graſs for nothing, beſides labour ſaved. As to my remaini
ten acres, I would have as much houſehold dung about t
farm, as would keep it in good order, with a very ſmall dru
gery of waring; ſo that, by this method, I think I could dou
their grain upon a great deal leſs than a third of their expen
Another method might be fallen upon with leſs expence ſt
viz. by keeping ſo much of this farm under fallow, beſi
the graſſing, which, if the ground were once brought to a p
per mould and in good heart, I am not ſure, but two hor
might ſerve.

As to the farms lying at a diſtance from the coaſt, I thi
we ſhould, in the firſt place, bring our ground under one den
mination, which is what I would wiſh to do with mine, a
may be done with little expence. It is the practice to hav
bear-land dunging yearly; but notice, that while that ſpot
ground will yield any thing, we ſtill wear it out, which is
loſs of all our farmers; for when they get it in heart, th
never let it reſt till it be reduced to its original ſtate or wo
Now I would humbly prefer the following method: In t
fi

firſt place, I ſhall ſuppoſe a farmer to poſſeſs ſixty acres, twen-
y of infield, thirty of outfield, and ten of haughs and laigh
and. The twenty acres of infield are commonly dunged
very third year, the folds or outfield once in ten only, while
he haughs get none: this keeps them continually in one
ract for ever, and commonly employs ten oxen, and ſix hor-
es, with five or ſix men ſervants, and will not yield at an ave-
age above three or four returns, which can ſcarce maintain
he very labourers; whereas, by a different method, I think
is practicable, on the ſame expence, to bring the whole
arm under the denomination of infield. In the firſt place,
he ground intended for bear ſhould be clean furrowed in the
nd of harveſt, and again in the end of April, or ſooner, if the
eaſon be dry: Harrow it purely; lay on your dung towards
he end of May; and then give it a third furrow very ebb, and
ow turnips in drills, at ſuch diſtances as horſes may hoe them
n the intervals. This ſpot of ground lay down with bear
nd graſs ſeeds. It is to be obſerved, that this puts you out
f one bear crop only, afterwards you have your bear regularly
n the turnip root, and if you have any forehand dung, as
very good tenant ought to have, you may have double bear
he firſt year, or limed ground will do, failing houſhold dung,
f it has carried but one or two crops of oats. I deſign a ſpot
f mine this year for bear that has carried three crops of oats,
n order to get my dung for turnip. This method ought to be
arried on until the whole farm, infield and outfield, be improven
nd brought in under the ſame kind of tillage in a few years,
hich may then be wrought by four horſes and two ſervants. It
ill be objected to this, that they will be out of fodder to raiſe
ung, and alſo corn to pay the farm or victual rent. How un-
eaſonable this is, I ſhall ſhow you: As they go on in the me-
od propoſed, I muſt ſuppoſe their ground to be well dunged
nd well laid out, ſo as they have the beſt of graſſing, or hay
they pleaſe; and any unprejudiced perſon may judge, whe-
er they have more profit, and will raiſe ſtronger dung by
hay

hay or graſſing, than can be afforded from their uſual po
worn out crops. Now, ſuppoſing the whole to be gone over
the above method, or the like, remember that there are ſix
acres in the farm, forty of which I keep in graſs, and twen
in grain. What dung I can get I always prepare, and lay
on the ley-ground, as I ſee moſt needful. So that having tw
parts in graſs, and one only in grain, you ſee that gives
whole ground ſix years reſt for every intaking, and three cro
of grain: Lay it always down with graſs the third crop wit
out any dung, if you pleaſe, as it will be by that method
great heart. Now having forty acres in graſs to employ
pleaſure, the twenty in grain ſhould yield eight returns, if th
ground be naturally good, and ſo produce one hundred an
ſixty bolls of grain, which is more than the whole farm prod
ces by the common management, and much expence, as well
ſeed and labour, ſaved.

April 7.

1773. A BUCHAN FARME

ARTICLE LVI.

*Of the proper ſucceſſion of Crops.—Plowing with Oxen an
with Horſes.*

[In a letter to the Publiſher.]

YOUR Having publiſhed my former letter, [N° V
p. 299.] has induced me to enlarge a little upon t
hints therein thrown out.

I am pretty confident, that the general obſerve I made hol
true, that the keeping too much land in tillage, and unjud
cious croping, is the chief reaſon of the bad ſucceſs of ma
tenants. I ſhall now endeavour to point out, how I appr
hend this error may be remedied, and the huſbandman en
bl

bled to pay his rent, and earn a more comfortable ſubſiſtence to himſelf.

It is pretty well eſtabliſhed, that all ſorts of plants which grow upright, and carry their ſeeds on the top of the ſtalk, are ſcourgers and impoveriſhers of the ſoil, and the longer any plant of this kind takes of arriving at maturity, the more ſevere it is.

It is likewiſe underſtood, that plants which ſpread upon and cover the ſurface of the ground with their ſtalks and leaves are inrichers and claners: The reaſon I apprehend is this; theſe of the firſt claſs being generally more compact and firm, exhauſt the earth of its vegetable food, and expoſing but a ſmall ſurface to the air, draw very little of their nouriſhment from it: they likewiſe, from their poſition, afford ſhelter to any weeds that may chance to ſpring, and thereby encourage their growth.

On the other hand, the plants of the ſecond claſs, which are more poreous, by ſpreading upon and covering the earth, expoſe a large ſurface to the air, and draw from thence a conſiderable part of their nouriſhment; at ſame time they retain the nitreous particles with which the dews and rains are impregnated, which by their cover they prevent being exhaled by the heat of the ſun. And laſtly, by interrupting the free circulation of air hinder the weeds from making ſuch a progreſs as to be hurtful.

From theſe principles it is evident, how deſtructive it muſt be to follow a plan of huſbandry, wherein the grains of the impoveriſhing kind are ſowen repeated times, without the intervention of the other ſort: yet I believe, I may venture to aſſert, that ſuch is the practice of moſt farmers in various parts of this country. On the higher lands it is not uncommon to ſow oats four or five years running, and then allow the land to lye ley for ſome years; and on their beſt managed infield land to ſow oats after barley, then peas, and perhaps oats twice running. In the lower grounds a very common courſe is, wheat after fallow and dung; next barley; ſometimes peas, but more

frequently oats; and then fallow again. In other places wheat, peas, barley, oats, all of which ſchemes I think are far from being good ones.

I will allow, that where plenty of dung is to be had, and the tenant able to purchaſe it in ſufficient quantity, good land, with the aſſiſtance of a fallow, may produce very heavy crops in the courſe of huſbandry laſt mentioned: But on the very beſt ſoils, lying at a diſtance from ſuch aid, it is merely impoſſible to raiſe ſuch crops: And I apprehend, that no conſiderable profit can be made, even where the ſoil is tolerably good, otherways than by raiſing of fallow or green crops; one of which, to wit, beans, peaſe, turnip, or clover, ſhould ſucceed every white crop; and in ſuch a ſcheme of management, with judicious plowing, a fallow need very ſeldom be introduced; and I believe would never be neceſſary, unleſs when by the failure of the peaſe, an extraordinary encouragement is given to weeds, though I ſubmit, whether it would not be judicious to plow down the peaſe crop whenever ſuch a failure is apprehended.

It is well known, that every ſoil is moſt favourable to ſome particular grain; the reaſon of which is very difficult to aſſign, nor am I ſufficiently ſkilled in natural phyloſophy to offer an opinion on the curious queſtion, Whether the food of all plants be the ſame; or if they are nouriſhed by juices of different natures? yet as the obſervation is well founded, the farmer ought to advert to it in arranging his crops.

In the next place, he ſhould be particularly attentive to have no more land in tillage, than what he can labour, in the moſt perfect manner, without being too much hurryed, even in an unfavourable ſeaſon; for upon the judicious performance of this operation, in a great meaſure, depends his ſucceſs, and it is much ſafer to have rather a large proportion of his lands in graſs. And here I muſt ſuggeſt, that in the general practice upon our ſtrongeſt ſoils, too few earths are given, and the land very ſeldom reduced to ſo fine a mould as it ought to be;

and I know well, that the beſt farmers in England give their land more plowing than we do, even where their ſoil is a great deal lighter,

It is with pleaſure I obſerve, that the horſe-hoeing huſbandry is now a good deal practiſed in this country. I believe it a very ſolid improvement in the culture of beans, turnips, &c. At the ſame time, I would very much like to ſee an eſtimate made, and communicated by one of your practical correſpondents, of the expence of culture and produce of an acre of land under theſe crops, in the huſbandry juſt mentioned, and in the hand-hoeing way. I am inclined to think the laſt is the moſt perfect; though I doubt, whether the additional increaſe would ballance the outlay.

The great objection made by tenants to the ſowing of graſs, and the other fallow crops, is, that ſuch plan cannot be properly followed out, unleſs where the land is incloſed; and that proprietors will not give proper encouragement, by granting tacks of a ſufficient length to make ſuch incloſures.

As to which, I muſt obſerve, that though there can be no doubt of its being much the intereſt of proprietors to have their lands incloſed, and that they ſhould give all manner of encouragement to their tenants to make ſuch, yet I am ſo much convinced of the benefit of fences, that, in my opinion, where a tenant takes a farm even for two nineteen years, it would tend much to his profit to incloſe it upon his own expence: for if the ſoil be good, hedges properly planted will make a tolerable fence in ſix or ſeven years; and then the tenant has the full command of his farm for twenty-ſix or twenty-ſeven years, in which time I do believe the profit would be found far to exceed the expence laid out: and when the leaſe expires, the tenant, from his knowledge of the nature of the ſoil, and the management beſt adapted to it, will be able to pay as high a rent upon a new leaſe as any ſtranger; and the landlord who would refuſe a preference to a tenant acting upon ſuch public

ſpirited

ſpirited principles, muſt be himſelf of a moſt ungenerous and illiberal mind.

There is another branch of rural œconomy, which I could wiſh to ſee the ſentiments of ſome one of your correſpondents upon; viz. the labouring with oxen. [N° II. p. 56. N° III. p. 113.] I am ſure the ſaving in hay and corn would be very conſiderable. The objection that I have heard generally thrown out by thoſe who uſe horſes, is, that the oxen are not ſo expeditious. This may be a good reaſon for not yoking them in the ſame plough with horſes, which indeed I always looked upon as a wrong practice; but when yoked by themſelves, I am convinced they do full as much work, for they apply their force with more ſteadineſs than horſes; and where more than two are required, ſo as to make a driver neceſſary, they are full as eaſily managed; and I do believe that queys, or even oxen, when put to work young, come to be as expeditious as horſes. At the ſame time, the uſing two horſes in a plough, with only one man holding and managing them with reins is a very great improvement, and ſhould be uſed on all occaſions, when the work is not too heavy, of which the farmer muſt judge from the nature and ſituation of his land. In moſt ſoils, the land intended for barley, and likewiſe the fallow, may be ſtirred and made with only two horſes to a plough.

Edinburgh, I am yours, &c.

19th *April* 1773. A B.

ARTICLE LVII.

The Culture of the great Red Clover, as practiſed in Bretagne *in France.*

[From Foreign Eſſays on Agriculture and Arts, &c.]

CLOVER yields amazing large crops, and requires not as much care in its culture as the other artificial graſſes. It is, beſides, particularly well adapted to ſuch lands as are ſuffered

ffered to lye idle for three or four years, after having borne veral ſucceſſive crops of corn.

Theſe years of idleneſs may properly enough be termed ears of barronneſs; yet the peaſants are unfortunately ſo far rejudiced in opinion, as to eſteem them a reſource for feed- ng their cattle. But this prejudice ſerves only to ſhew, how ew natural paſtures there are in the province; and of courſe ow neceſſary it is to cultivate thoſe which are called artifi- ial.

In countries where there is plenty of feed for cattle, green n ſpring, ſummer, and autumn, and dry in the winter, would allows barley covered with weak, languiſhing, and often dan- erous weeds, be eſteemed a reſource? Theſe paſtures, if they an be ſaid to merit that name, are neceſſarily hurtfull to attle.

The leanneſs and want of ſpirit in our cattle, in moſt arts of the province, may, in a great meaſure, be aſcribed o the want of a ſufficient quantity of winter fodder, and he ſcarcity of feed on the fallows in ſummer. They ainly wander in ſearch of a belly-full. Hunger and the ant of better feed, make them eat indiſcriminately all the lants they meet with, and of courſe ſome that are very per- icious in their natures.

It would therefore certainly be of great benefit to ſub- ſtitute, inſtead of this ſcanty feed, plants which are vigorous nd nouriſhing.

Clover would anſwer this purpoſe effectually, and the cul- ure of it is by no means difficult.

The land muſt be well plowed, and got into fine tilth. The ſeed may be ſown in March, April, May, June, or July. Eight pounds will ſow an acre of land.

On the ſame land, and at the ſame time may be ſown, oats, arley, buck-wheat, or flax; the laſt however is to be preferred, ecauſe, in pulling it, the earth is looſened, and a new mould aiſed about the roots of the clover.

The

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The leanneſs and want of ſpirit in our cattle, in moſt parts of the province, may, in a great meaſure, be aſcribed to the want of a ſufficient quantity of winter fodder, and the ſcarcity of feed on the fallows in ſummer. They vainly wander in ſearch of a belly-full. Hunger and the want of better feed, make them eat indiſcriminately all the plants they meet with, and of courſe ſome that are very pernicious in their natures.

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The

The clover-ſeed ſhould be mixed with double its quantity of ſand or aſhes, as it may by that means be ſown with greater regularity, and there will alſo be a conſiderable ſaving in quantity.

A very light harrow, or a rake, will ſerve to cover the ſeed; if it lay too deep, it would not come up at all.

Clover ſhould be cut juſt as it begins to flower, except ſuch as is intended to be ſaved for ſeed, which ſhould be from the ſecond cutting.

This plant will grow in all ſoils, but it thrives beſt in freſh land that is not too moiſt.

It laſts at leaſt three years, and ſometimes five,

It is much more advantageous to ſpend it green than dry. Cattle ſhould be kept out of clover lays, and the crop will be greately enlarged if ſome rotten dung is laid on the field in the winter.

When the crops fall off they are broke up by the plough, and the farmer finds his land greatly improved.

Clover is of ſo much the greater advantage to the farmer as it puts him to no other expence than the purchaſe of the ſeed, which is no great matter.

Clover thrives very well being ſown with oats. M. le Preſident de Montlac ſowed ſome in this manner in 1758, and had a prodigious crop of oats.

At harveſt the clover was very thick, and near two feet high.

The manure which the ſeveral crops of corn have left on the land, ſerves to bring the clover forward. From the ſeveral circumſtances it is plainly evident, that for only the coſt of the ſeed the farmer may have a rich paſture, which he may cut at leaſt twice, and frequently three and four times a year; and even this ſmall expence would be greatly reduced, was clover as plentifully cultivated in the province as we could wiſh.

M.

M. le Baron de Pontual, who has cultivated large quanti-
es of clover, and who wrote the above method, 3000 copies of
hich have been diſtributed, obſerves, that this food is apt to
at cattle, if they have not ſome other food given them with it.
Flemiſh farmer taught him a method of remedying this
uality of clover, and at the ſame time of making it go much
rther.

In Flanders, where a conſiderable quantity of it is cultivated,
ey ſtack it in alternate layers, ſix or ſeven inches thick, with
raw.

The Clover imparts a ſhare of ſmell and taſte to the ſtraw,
ſomuch that oxen and horſes will eat either with equal re-
h. By this means the ſtraw becomes of the ſame value
ith the Clover, and keeps the cattle cool and in good order.

M. de la Chalotais, and M. de Nevel, planted clover in rows,
ſee if this, like many other plants, might not that way be
ade to yield a larger crop. The experiment did not ſucceed,
t it might, in ſome ſort, be deemed ſucceſs, to diſcover, that
ver, which thrives well ſow it how you will, produces by
the moſt conſiderable crops when it is ſown broad-caſt.

ARTICLE LVIII.

An experiment to make Potatoes thrive without Dung.

Propoſed plowing ſeveral times, either in the ſpring or du-
ring the ſummer, a piece of ground, containing about
f an acre, of an indifferent quality, the ſoil inclining to ſand,
ending to apply it to ſome other uſe. But I thought I
uld try, whether by following the directions given by Mr
Hamel I could get a crop of potatoes from it.

planted accordingly ſome in ſtreight lines, two feet aſun-
, and the plants forty inches diſtant in the rows, plowing
the

the intervals three times in the ſummer, that is to ſay, eve
ſix weeks.

The plough that was uſed was very light, and witho
wheels, and with two horſes going one before the other,
was very eaſy to draw two furrows about five inches dee
without much damaging the roots.

My workmen, at firſt, ſmiled at my attempt: the potato
ſprouted but ſlowly, and did not ſeem to promiſe any great ſu
ceſs; but after the firſt plowings they got forward, and af
the other two plowings were to the full as forward as thoſe
my neighbours, which had been plentifully dunged. Final
after the third plowing every one was altoniſhed to ſee th
the ſtalks of my potatoes, which had not been at all dunge
were freſh and green, when the ſtalks of the others, which h
been dunged, were turned yellow, withered, and alm
dry.

In a word, this piece of ground yielded me in autu
half as many potatoes again, as the ſame quantity of l
would have done in the ordinary method of planting, a
theſe were all of a delicious flavour, without reckoning w
were given to the hogs, on account of their being either
ſmall, or damaged by worms.

This ſmall experiment will encourage me to adopt the fa
method, in ſucceeding years, and in incloſed fields, when t
are intended to be fallow, planting them with various roo

In this manner, may the careful huſbandman always p
miſe himſelf ſucceſs by adopting this method, and he will
delivered from the pernicious weeds which now conſt
infeſt his fallows.

ARTICLE LIX.

Of plowing and Ridges—Of altering Ridges—Of the poſition of Ridges—Of plowing in Ridges.

[Dickſon's Agriculture, Vol. I.]

Of Ridges.

IT has already been obſerved, that plowing in ridges is proper for removing wetneſs. Every furrow becomes a kind of drain: the rain that falls upon the ridge makes its way to the furrows, and by means of them is conveyed away from the field.

Plowing in ridges is alſo proper for enlarging the ſurface. It is certainly an advantage to have the ſurface enlarged. Thereby not only a greater quantity of ſoil is expoſed to the influence of the air, but alſo a greater quantity of it actually employed in vegetation. There is no more ſoil added to the field by enlarging the ſurface; but ſome of the ſoil that lies buried, while a field is in its natural ſtate, is expoſed to the air, and brought within reach of the roots of plants, when it is laid up in ridges. Some of the plants which we cultivate in our fields, have what are called horizontal roots, that is, roots that creep along the ſurface, and go down but a ſhort way. Now, it is obviouſly an advantage to theſe plants, to have a quantity of the ſoil below, to which their roots cannot extend, brought within their reach, which is done by enlarging the ſurface.

The top-rooted plants, that is, ſuch as puſh one principal root perpendicularly downwards, have alſo horizontal roots, by

which they are nouriſhed; and therefore it muſt likewiſe be an advantage to them, to have the ſurface enlarged.

To illuſtrate this further, let us ſuppoſe, that the roots of plants upon a field extend themſelves through the whole ſoil within four inches of the ſurface. Now, it is obvious, that there is more ſoil within four inches of the ſurface, when the ſurface is enlarged by ridges, than when the land is lying quite flat.

From theſe things then it appears, that a field contains more food, and has a larger paſture when in ridges, than when laid down level.

It muſt be acknowledged, that ſome conſiderable perſons are of a different opinion; and as this is the caſe, it will not be improper to conſider what is advanced by them.

There are ſome who mention the perpendicular growth of plants, as an evidence, that a ſurface, however much extended, can ſupport no more plants than the horizontal baſe. Though the fact is allowed, that plants grow perpendicularly, and that it is impoſſible to place more of them upon the ſurface than upon the baſe; yet it does not follow, that a field when its ſurface is enlarged, can nouriſh no more of them; and it is to be remembered, that it is not more room which we contend for, but more nouriſhment. We may further obſerve, with reſpect to the growing of vegetables, that the enlarging the ſurface has this other advantage; it gives the plants more air, and thereby prevents them from falling down and lodging.

Mr du Hamel, to ſhow that the enlarging the ſurface by ridges is a real diſadvantage, obſerves, that ſuppoſing the ſlope in ridges is one foot in ſix, yet the ſurface will be to the horizontal baſe only as 76 to 75, which he ſays, is but a ſmall advantage, when compared to the loſs by the furrows.

In anſwer to this, it needs only be ſaid, that there is no loſs by the furrows, unleſs when they are a real advantage to the reſt of the field. When land is dry, the corn is as good in the furrows as in any part of the ridge; and when the land is wet

wet, the furrows ſerve for drains, and the loſs by them is more than made up, by the advantage which the reſt of the field receives by being drained.

We may therefore conclude in the general, that the way of plowing in ridges is preferable to the way of plowing without ridges †.

Having ſhown, that ridges are advantageous as they remove wetneſs, and enlarge the ſurface, it is neceſſary now to conſider what kind of ridges are moſt proper for anſwering the ends propoſed.

As ridges remove wetneſs, when the ſoil is wet, the ridges ought to be narrow. For the greater number that there are of ridges, there are the greater number of drains. When the ſoil is wet, the ridges ought alſo to be ſteep. For the ſteeper that the ridges are, the water more eaſily finds its way to the furrows.

When the ſoil is very dry, it is ſubmitted, if narrow ridges are not proper likewiſe; for by altering the ridges, and turning the furrows into the crowns, and the crowns into the furrows, a quantity of freſh ſoil is always employed in vegetation. When the crown of a ridge is turned into a furrow, it is obvious that ſome freſh ſoil is turned up, which was not employed in vegetation in its former ſituation; and the greater number there are of ridges, there is the greater quantity of freſh ſoil employed.

When the ſoil is juſt ſo wet as to occaſion loſs in the furrows, then the ridges ſhould be ſomewhat broader; for, in this caſe, the fewer there are of furrows, there is the leſs loſs.

It

† It is a cuſtom in ſome places, to plow without making ridges. It is done in this manner: The plough enters in the outſide of the field, and goes round and round it till it is near finiſhed, and then plows out what remains, in the ſame manner, as if it was a ridge. Thus the field is left without ridges, having only one furrow for a ſhort way in the middle of it. At the next plowing this may be reverſed, the ridge in the middle of the field gathered up, and the plough go round and round the ridge till the whole field is plowed.

It is proper to obſerve here, that a difference ſhould be made betwixt the ſituation of land in the winter, and its ſituation in the ſummer. It may be convenient ſometimes, when winter-grain is to be ſown, or when the land is to get winter-fallowing, to make the ridges very narrow; and, when ſummer-grain is to be ſown, to make them broader.

As it is an advantage to have the ſurface enlarged, the ridges ought to be made high in the middle, or crown; for the higher that the ridge is made, the more is the ſurface enlarged.

When the ſoil is ſhallow, the ridges, if broad, cannot be high raiſed, without depriving the furrows of ſoil: and therefore, to enlarge the ſurface on ſuch land, the ridges muſt be made narrow; for this both enlarges the ſurface, and prevents the furrows from going below the ſoil.

When the ſoil is deep, the ridges may be made broader for though the ridges are raiſed in the crown, yet ſtill there is ſoil left in the furrows. But then the ridges muſt not be made too broad: for it is evident, that narrow ridges give more ſurface than broad ridges, of the ſame degree of ſteepneſs and do not cover the lower parts of the ridges ſo much from the influence of the ſun and winds.

It is neceſſary to obſerve, that though, in the general, it is recommended to raiſe the ridges in the crown, to enlarge the ſurface, and to allow the water more eaſily to find its way to the furrows; yet, in ſome low flat-lying land, it is proper to make the ridges as flat as poſſible, in order to raiſe the furrows; for the higher that the furrows are raiſed, there is, in ſome caſes, the greater command of the water, and it is the more eaſy to find a fall for conveying it away.

It is neceſſary to obſerve likewiſe, that flat ridges have the advantage over ſteep ridges; they can be ſown with greater exactneſs. It is obvious from the method of ſowing, that in ſowing ſteep ridges, it is not poſſible to prevent too great a proportion of the ſeed from falling into the furrows. It is obvious likewi

likewiſe, that this proportion is increaſed by harrowing. Whereas, in ſowing flat ridges, the ſeed is equally ſcattered, and the harrows do not remove it from its place.

From theſe obſervations it is evident, that ſoils in different ſituations require to be laid out in different kinds of ridges. It is abſurd, therefore, to aſſert, that, in every caſe, one kind of ridges is preferable to another; that narrow ridges are better than broad ridges, and flat ridges better than ſteep ridges: in ſome ſituations, one kind of ridges is moſt proper; and, in other ſituations, another kind is moſt proper. Every perſon ought, therefore, to conſider the nature of the ſoil he has to deal with, conſider the advantages and diſadvantages of each kind of ridges, and then determine which are moſt proper.

When there is nothing in the nature of the ſoil to determine what kind of ridges are moſt proper, then narrow ridges are to be preferred; for this reaſon, that a quantity of land in narrow ridges is ſooner plowed than when in broad. It is obvious, that the two firſt furrows which the plough takes off from the ridge, are wider than any taken off afterwards, eſpecially if the plough begins in the furrow, as is frequently the caſe; ſo that the greater number there are of ridges, the field is the ſooner plowed. Beſides, when ridges are broad, it is obvious, that the plough has more work, and muſt take longer time in turning, than when they are narrow. But then it is ſuppoſed that the ridges are ſtreight and equal. If they are not, the greater number there are of them, the greater is the trouble, and the more time is ſpent in plowing. This, however, it muſt be owned, is of no great importance; becauſe it ſeldom happens, that the kind of ſoil does not determine what kind of ridges are moſt proper.

Having conſidered the kinds of ridges proper for land, according to its different ſituations; it is proper to inquire, whether there are any qualities which ridges ought to have, whatever is the ſituation of the land.

It will eaſily appear, that all ridges ought to be made ſtreight. Crooked ridges are attended with ſeveral inconveniencies. In

plowing

plowing them, the cattle are not always going exactly in the ſame direction with the plough; ſhort turnings are often neceſſary, as fields are generally bounded by ſtreight lines, or lines not crooked in the ſame manner with the ridges; and when there is a ſmall deſcent, the water, as it runs in the furrows, meets with reſiſtance.

It is obvious, that when the plough goes in a curve, as it does in plowing crooked ridges, the draught is not in the ſame direction with the beam, but is either to the right or left of it; and this gives the plough either too much or too little land.

It is obvious likewiſe, that, when ridges are crooked in a manner different from the lines by which a field is bounded, in plowing the ridges upon the ſides, one part of them muſt be finiſhed before ſome other parts are near done; and then ſhort turnings are neceſſary, which hurt the land much by the treading of the horſes.

It is obvious likewiſe, that as a crooked furrow is continually altering the direction of the water, and has a leſs deſcent than a ſtreight furrow, the water, as it runs along it, muſt meet with greater reſiſtance, and thus penetrates the ſoil and makes it more difficult to convey it away.

Theſe inconveniencies are removed by making the ridges ſtreight: for, in plowing ſtreight ridges, the cattle are always going in the ſame direction with the plough; no ſhort turnings are neceſſary, as fields can be made of an equal breadth in all places; and the furrows having a greater deſcent, the water meets with leſs reſiſtance, and is more eaſily conveyed away.

Streight ridges not only remove the inconveniencies with which crooked ridges are attended, but it is found that they are attended with no inconveniencies themſelves: they require indeed a little attention in the plowman, which is itſelf an advantage; and therefore upon all occaſions are to be preferred.

As, in all kinds of ſoil, ridges ought to be ſtreight, ſo likewiſe they ought to be equal, equal one to another, and

ſame ridge equally broad in all places. Unequal ridges are attended with inconveniencies, as well as crooked ridges. It is difficult to ſow them with exactneſs; it is difficult to alter them, when neceſſary; and the plough muſt often turn in the middle of the ridge, which does great harm, by the treading of the horſes, or it muſt be driven empty to the end.

Theſe inconveniencies may be removed by making the ridges equal. Equal ridges may be ſown with greater exactneſs, and conſequently with leſs ſeed; it is eaſy to change them, one into two, or two into three, as occaſion requires; and the ſame furrow that finiſhes the plowing of the ridge in one place, finiſhes it in all places; ſo that there is no neceſſity to turn the plough in the middle of the ridge, or to drive it forward the ſhorteſt ſpace, without turning up a furrow.

Of altering Ridges.

In the laſt ſection, we endeavoured to ſhow what kind of ridges are moſt proper for the different ſoils; and what qualities they ſhould be poſſeſſed of in all ſoils.

In many places of the kingdom, they are ſtill crooked and unequal; and, in many places, they are much broader, and much higher raiſed in the crown, than the nature of the ſoil allows. Were the ridges altered, and the fields laid down in a proper manner, as the ſoil requires, it would be a great advantage. At the ſame time, it may be obſerved, that much harm is done, by proceeding in this matter with too much precipitancy. It is neceſſary, therefore, that we conſider it as an affair of ſome importance.

It is neceſſary to obſerve, in the firſt place, that ridges muſt not be raſhly altered; on the contrary, great caution is to be uſed. If the ſoil is very dry, ridges may be altered without great danger, though high; and they may be made ſtreight without being levelled: for though the old furrows are ſtill lower than the reſt of the field, yet this is attended with no bad conſequences in dry land; and, by degrees, they are filled

up

up in plowing. But then, it is to be obſerved, that there is not much land in Scotland, on which the ridges, at preſent, are high raiſed, in its nature ſo dry, as to allow this to be done.

If the ſoil is wet, the ridges cannot be made ſtreight till the ground is level, without great danger; for the water will lodge in the hollows of the old furrows, from whence it will not be poſſible to force it. Some perſons that make their ridges ſtreight before they are ſufficiently levelled, draw water-furrows along the hollows of the old furrows, to carry off the water that is apt to lodge there. This is of ſome uſe, but does not fully anſwer the purpoſe. A quantity of looſe earth in plowing, is thrown into the old furrows. The water, as it falls, penetrates this looſe earth, and is retained by it, notwithſtanding the water-furrows. Beſides, theſe water furrows muſt be neatly cleaned out with a ſpade, and made deeper in the places where they are intercepted by the crowns of the new ridges, otherwiſe they are of very little uſe.

Before ridges can properly be made ſtreight, it is neceſſary therefore that the land be made as level as poſſible.

But it muſt be obſerved, that it is as dangerous to level ridges raſhly as to alter them before they are levelled: for if ridges are levelled too faſt, and thereby a great depth of looſe earth thrown ſuddenly into the furrows, it will not be poſſible to convey away the water that falls upon them. The water as it falls will ſink to the bottom, and there will lodge and chill the ſoil; and the earth thrown into the furrows being looſe, the cattle in plowing muſt ſink to the bottom likewiſe, by which the land is very much potched.

It is recommended therefore to every perſon, ſeriouſly to conſider the nature of the ſoil he has to deal with, before he proceeds to the altering old ridges; and if the ſoil is wet, to level the ridges very gradually. When the ſoil is deep, and inclining to be wet, and a ſufficient ſlope for carrying off the water, it is probable, that the loſs ariſing from the levelling ſteep and broad ridges ſuddenly, may exceed the profit of ma-

ny years arising from the ridges being properly laid down; and therefore, if a view to incloſing makes it neceſſary to ſtreight the ridges, the levelling them ſhould be the work of ſeveral years. Even ſuppoſing that the ſoil is ſhallow, and the ridges raiſed ſo high, that there is nothing but *till* left in the furrows, yet ſtill it is improper to level the ridges too faſt, though levelling in this caſe is neceſſary *.

In levelling ridges a great hollow is made in the crowns. This is occaſioned by frequent ſucceſſive cleavings, which is the method commonly uſed for levelling ridges. It is obvious, that by the firſt cleaving a hollow is made in the crown of the ridge equal to the depth and breadth of the furrow which the plough makes; whereas the parts on each ſide of the ridge are but little levelled, and at each ſucceſſive cleaving this hollow is made greater. Such a quantity of new earth immediately turned up, is not fit for vegetation †. Beſides, this hollow becomes ſo great, and the parts of the ridge on each ſide of it become ſo ſteep, that it is impoſſible to plow them in a proper manner.

In this caſe, when levelling is ſtill thought proper, ſome furrows from each ſide muſt be thrown back by the plough into this hollow, by which a new ſmall ridge is formed upon the crown

* When ſoil is of a cold ſpungy nature, and does not eaſily part with the water, unleſs there is a ſcheme of improving it by lime or marles, it is uncertain whether it may not be proper to continue the ridges broad and high, though the furrows are deprived of ſoil. The levelling the ridges in this caſe makes the whole ſoil in danger of being chilled, as the water is not ſo eaſily conveyed away; whereas, when the crowns of the ridges are high above the furrows, the water more eaſily finds its way to them, and thereby a part of the land is preſerved in proper order; which may poſſibly do more than overbalance the loſs of ſoil ariſing from the lowneſs of the furrows.

† As it is probable that the earth receives its vegetable food from the air; ſoil, though in its nature fit for receiving this vegetable food, when new turned up from below the reach of the air, is not fit for nouriſhing plants.

crown of the old one, and then the remaining parts of the ridge may be levelled as before. Some perſons, inſtead of this, plow acroſs the ridges. This method ſerves the ſame purpoſes; it both throws ſome earth into the hollows, and levels the ridges: for the plough in going carries off ſome earth from every height, and leaves ſome in every hollow. But then land muſt not be left in this ſituation during the wet ſeaſon, unleſs water-furrows are drawn along the furrows, and alſo in ſome caſes along the crowns; for unleſs this is done, the water that falls upon the field cannot be conveyed away. At the next plowing, the whole old ridges may be levelled in the ſame manner as at the firſt plowing; or, if thought more proper, may be divided into two equal ridges, plowed in ſuch a manner that the furrow betwixt them may be exactly in the crown of the old ridge, and the other furrows exactly in the furrows of the old ridge. By this operation the old ridge is raiſed from the furrows, and levelled from the crown †.

When a perſon is upon a ſcheme of levelling, this method of dividing the ridges into two will be found very proper, either when winter-grain is to be ſown, or when the barley-land gets the winter-plowing.

Though land may be in ſuch a ſituation as to allow the ridges to be levelled with ſafety, yet unleſs it is remarkably dry, and in no caſe in danger of being damaged by too much water, the ridges ſhould not be altered, excepting when the land is ſummer-fallowed; and in that caſe, beſides the plowing that alters the ridges, there ought to be another before the wet ſeaſon comes on, that ſo the bottom may be ſufficiently firm to reſiſt the water.

Of the poſition of Ridges.

We have obſerved, that ridges ſerve to remove wetneſs, and to expoſe the ſoil to the influence of the air, and we have ſhown what

† This method of dividing the ridges into two is very proper, whether immediately before this they have been plowed acroſs, or a ſmall ridge formed upon the crown of the old one in the manner that has been deſcribed.

what kind is moſt proper for theſe purpoſes. But this is not enough; it is neceſſary likewiſe to conſider in what manner ridges ought to be placed. This is a matter of ſome conſequence: for, according to the poſition of ridges, water may be either conveyed away or retained, and ſome aſſert likewiſe, that by this the ſoil may be better expoſed to the influence of the ſun and wind. Theſe things therefore muſt be kept in view in the placing of ridges.

When the land is wet, as is often the caſe, it is certain that ridges ought to be placed with a view to the conveying away the water: but when land is dry, as is ſometimes the caſe, then ridges ſhould be placed with a view to the retaining the water.

The moſt common way of placing ridges where there is a ſlope, is along the declivity, in a ſtreight line from the top to the bottom; and land is commonly laid out with a view to this. Where the declivity is gentle, this is, no doubt, a very proper way of placing the ridges; but if the declivity is great, this way of placing the ridges, allows the ſoil to be waſhed away by the rain. It is obvious, that water, in running off of land, carries a part of the ſoil along with it, and the quantity is great in proportion to the violence with which it runs. In climates where there are heavy ſhowers of rain, the damage done by this is not inconſiderable. Therefore, in this caſe, placing ridges acroſs the declivity is the moſt proper way; for when ridges are placed acroſs, the water meets with many interruptions in its courſe, and does not run off with ſuch violence as when they are placed along from top to bottom, and therefore does not carry off ſuch a quantity of the ſoil along with it.

Inſtead of this ſome perſons make the ridges very narrow. This ſerves the ſame purpoſe; for, in proportion to the number of furrows, there is the leſs water in each furrow, and conſequently it runs with leſs violence. However, placing the ridges in this manner is not ſo proper as placing them acroſs the declivity, either for retaining the ſoil in a wet ſeaſon, or for retaining the water in a dry ſeaſon.

When

When land is very dry, and in no danger of being damaged by the ſtagnation of water, the ridges ought to be placed acroſs the declivity, as near the level as poſſible; for this retains both the water and the ſoil. It is obvious, that when ridges are placed in this manner, the water cannot get off by running along the ſurface, by which the ſoil is in greateſt danger of being carried away. As the furrows ſtop it in its courſe down the hill, it can get off in no other way than by penetrating the ſoil. By this a part of it is retained; what of it gets off is clear, and carries no ſoil along with it.

When land is dry at the head of the ridges, and wet at the foot, and no proper fall for carrying off the water, as is frequently the caſe, the ridges ſhould be placed in the ſame manner, directly acroſs the declivity. For, in this caſe, every furrow in ſome meaſure retains the water that falls upon the ridge above, and thereby prevents it from ſinking towards the bottom of the field, and lodging there. By this way of placing the ridges, the dry part of the field is rendered wetter, and the wet part of the field is rendered drier than otherwiſe they would be.

This is likewiſe a very proper way of placing the ridges, even when the declivity is but ſmall, if the land is in the ſituation mentioned, dry at the head, and wet at the foot. It muſt be owned, however, that this will not entirely anſwer the end propoſed: for the water will penetrate the ſoil; and when it is reſiſted by till or clay, will find its way along theſe to the bottom of the field. But this will not be ſo ſudden as in the other way of placing the ridges; and the ſoil at the head, which is naturally dry, will receive more benefit from the rain as it falls.

When land is wet, and the water may be conveyed away from the bottom of the field, the ridges ſhould be placed acroſs likewiſe; not directly, but with a ſmall ſlope to a drain or furrow on the ſide of the field from top to bottom, by which the whole water is conveyed away. In this caſe every furrow becomes

becomes a drain to the ridge below, and prevents the water from running over it.

When land is wet from the breaking out of ſmall ſprings, this way of placing the ridge is alſo very proper. The furrows convey away the water as it riſes, and prevent it from doing any damage.

It is neceſſary to obſerve, that ridges placed in this manner, to ſerve theſe purpoſes, ſhould not be altered; for when the furrow is kept in one place, it is a more proper drain than when altered. When the furrows are kept in one place, the bottom is always firm, and the water runs eaſily along it; whereas, if changed, it may fall upon places of the field, where the ſurface, being raiſed by former plowings, will prevent them from reaching the firm bottom. Beſides, if the ſpring break out in the furrows, by changing their place, they may break out in other parts of the ridge.

It is neceſſary to obſerve likewiſe, that ridges placed in this manner ſhould not be raiſed in the crown, but kept quite flat; that ſo, by the natural deſcent of the ground, the whole water that falls upon the ridges may be conveyed into the furrows below: and that it may the ſooner reach the furrows, it is neceſſary that the ridges be made narrow.

It was before obſerved, that ſome perſons aſſert, that, by a proper poſition of ridges, the ſoil is better expoſed to the influence of the ſun and air. Theſe perſons recommend the paying a regard to this. But it cannot be done, excepting when the land is quite flat, and when the placing of the ridges makes no difference as to its wetneſs. However, as this is repreſented by thoſe perſons as important, ſome attention ſhall be given to what they ſay.

Some adviſe the placing the ridges ſouth and north; and the reaſon which they aſſign for this, is, that thereby the ſun may have an equal influence upon all parts of the ridge.

Others, again, adviſe the placing the ridges eaſt and weſt; and the reaſon which they aſſign, is, that they may ſhelter each other from the cold north wind. Which

Which of theſe advantages is the greateſt, is uncertain. It is even uncertain whether they are really advantages.

It may be diſputed, whether, in the winter-ſeaſon, cold or heat is moſt beneficial to land. That heat is beneficial, and cold deſtructive, to the plants that grow on our fields in the winter-ſeaſon, may be true. But cold poſſibly may be as proper as heat for preparing the land for the nouriſhment of theſe plants. It is allowed, that the coldneſs of the north wind is, in ſome meaſure, owing to the quantity of ſalts that it carries along with it. Theſe ſalts are beneficial to land: and therefore an expoſure to the north ſeems to be rather a benefit than a diſadvantage. This is confirmed from obſervation. The lands on the north ſide of riſing grounds are, generally ſpeaking, more fertile than thoſe on the ſouth ſide. It is certain that the richeſt lands in Scotland have this ſituation, and are expoſed to the north.

It may be diſputed likewiſe, whether the north or the ſouth ſide of an eaſt and weſt ridge has moſt benefit from the ſun in ſummer. It is not to be denied, that the rays of the ſun fall more directly on the ſouth ſide of the ridge; but then let it be obſerved, that the north ſide has the benefit of the ſun's rays in the mornings and evenings, when the ſun is ſo low, that the ſouth ſide is under the ſhade; which may poſſibly balance the loſs ſuſtained by the greater obliquity of the ſun's rays about mid-day.

Theſe things have been mentioned, to ſhow, that it is uncertain, which way of placing ridges expoſes the land beſt to the influence of the ſun and air; and therefore, that, in placing them, it is needleſs to have any view to this. When the placing of ridges makes no difference as to the wetneſs of land, then we are chiefly to have in view the conveniency of plowing and laying out the land in proper breaks.

Of plowing in Ridges.

There are three different ways of plowing ridges: gathering, caſting, and cleaving. Gathering

Gathering keeps the crown and furrows of the ridge in the ſame place in which they were before. The plough begins in the crown, and plows out the ridge, turning the earth towards the crown where it entered. Every ridge is plowed by itſelf; or, inſtead of this, the halves of two contiguous ridges may be plowed together. By this method of plowing, the ridge is higher raiſed than before. It is obvious, that, as the earth on each ſide is turned upon the crown, and thrown up out of the furrows, the ridge is raiſed, both by making the crown higher, and the furrows lower.

Caſting keeps the crowns and furrows likewiſe in the ſame place, in which they were before. The ridges are plowed in pairs. The plough may enter in the furrow betwixt the ridges, and plow out the ridges, turning the earth towards the furrow, where it entered. Or the plow may enter in the furrow on the right ſide of the two ridges, then turn to the one on the left, and plow out the ridges, turning the earth to theſe furrows, and from the furrow that is betwixt them. By this method of plowing, the ridges are kept of the ſame height in the crown, and one of the furrows made a little higher, and the other a little lower than before. The earth is taken from one furrow, and thrown into the other, and this is done alternately through the field. If this is reverſed at next plowing, that is, the earth turned into the furrows from which it was taken at the former plowing, thereby the ridges are preſerved in the ſame ſituation.

Cleaving is the reverſe of gathering. The plough enters in the furrow on the right ſide of the ridge, turns to the furrow on the left ſide, and plows out the ridge, turning the earth from the crown towards the furrows. Every ridge is plowed by itſelf; or, inſtead of this, the halves of two contiguous ridges may be plowed together. If the ridge is raiſed in the crown, by this method of plowing it is made flatter. It is obvious, that, by this method of plowing, earth is thrown into the furrows, by which they are made higher; and that earth

is

is taken from the crowns, by which they are made lower. the ridge is already flat, by this method it is changed, and t crown turned into the furrow.

When a field is laid out in the manner judged moſt prope with reſpect to the breadth and height of the ridges, it ſhou be plowed in one or other of theſe ways mentioned, accordi to its ſituation. If the ridges are broad and high, caſti will be found to be the moſt proper method of plowing. F this is the only way by which they can be plowed, and y kept in the ſame ſituation: cleaving will make them flatte and gathering will raiſe them higher †. If they are flat a narrow, cleaving will be found to be the beſt method. Clea ing flat ridges, and thereby turning the crowns into furrow and the furrows into crowns, has theſe peculiar advantage a field is much ſooner plowed in this way, than in any othe and a quantity of freſh earth, at every plowing, is expoſed the air, and employed in vegetation: and the ridges bei kept level, are ſown with exactneſs. In no caſe gathering proper, unleſs when the proper ſituation of the ridge rend it rather too wet for winter grain ‡.

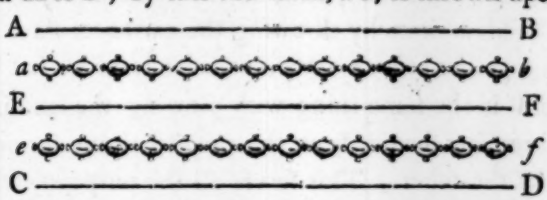
It may not be improper, in this place, to conſider a meth of plowing, uſed in ſome places, called *ribbing*. This meth of plowing is performed by making furrows about two f diſtant from each other: one half of the ſurface is untouch by the plough, and the other half, which the plough turns in making the furrows, is thrown on the top of what rema faſt. The land may be plowed in this manner, either with regard to ridges: or the plough may be made to enter a turn, as it does in gathering, caſting, or cleaving; that is

† If land plowed in this manner is harrowed acroſs the ridges, th by ſome of the earth is taken from the crowns, and left in the furro by which the ridges are made flatter. This makes it neceſſary ſometi to gather the ridges, that thereby they may be raiſed to their pro height.

‡ When it is ſaid that in no caſe gathering is proper, it is ſuppo that the ridges are already laid out in the moſt proper manner.

ridge may be ribbed in the way of gathering or cleaving; and two ridges may be ribbed in the way of caſting, This kind of plowing is ſeldom practiſed but in the beginning of winter, and upon land to be ſown with barley, after two more clean plowings. It does not prevail ſo much as formerly, and is very much condemned by our modern improvers. But, however much it may be condemned, it certainly has its uſes. It keeps the land dry; the rain that falls is confined to the furrows, from whence the looſe earth is taken, and eaſily finds its way off. It facilitates the rotting of the ſtubble, by covering it and keeping it dry; it makes the froſt penetrate a greater quantity of the ſoil; and it alſo expoſes a larger ſurface to the influence of the air. Theſe things make this kind of plowing, in ſome caſes, preferable to a clean plowing.

There is a method of plowing uſed in England, as mentioned by ſome of the writers on huſbandry, called *bouting*. It is performed by throwing the earths of two furrows towards each other upon ſome faſt land. This is certainly an improvement upon the Scots method of ribbing, and better anſwers all the purpoſes of it. For the better underſtanding how this way of plowing is performed, let A B C D repreſent a part of a ridge, to be ribbed in this manner. The plough goes firſt from A to B; by this the earth, *a b*, is thrown upon ſome



faſt land: the plough next goes from F to E, at ſuch a diſtance from A B as not to turn back the earth *a b*, but to throw ſome more earth on the top of it; then the plough returns in the track E F, which throws up the earth *e f*; and next goes from D to C, at the ſame diſtance from E F, that E F is from A B. By this are made two ribs and three furrows; and, in the ſame manner, a whole field may be

plowed. The advantage of this above the ordinary method of ribbing is this: When the field is plowed again, the work may be reverſed, the faſt land that was left turned up, and a furface, entirely new, expoſed to the influence of the air. To reverſe this, the plough goes firſt from *b* to *a*, by which the half of the earth *a b*, with the faſt land below it, is turned into the furrow A B; the plough next returns from *a* to *b*, by which the other half of the earth *a b*, with the faſt land below it, is thrown into the furrow E F: then the plough goes from *f* to *e*, by which the half of the earth, *e f*, with the faſt land below, is thrown into the furrow E F, on the top of the laſt half of *a b*. The plough next returns from *e* to *f*, by which the other half of the earth, *e f*, with the faſt land below it, is thrown into the furrow C D; and ſo on through the field. By this ribs are placed where furrows were before, and furrows where ribs were before; and the ſurface is entirely changed, what was above turned down, and what was below turned up. Theſe two plowings may be performed with the ſame ſtrength, and in the ſame time with one clean plowing; and it is probable, that, upon trial, in ſome caſes, will be found more beneficial.

As a further improvement of this method of plowing, it is propoſed to rib the land, and, at the ſame time, to plow it clean. This is done by throwing the earths of three or four urrows together in ſuch a manner, as to leave no faſt land below; and is the ſame thing with plowing the land in ridges about three feet broad, from the middle of one furrow to the middle of the other. This ſerves all the purpoſes of the other kinds of ribbing, and, beſides, has theſe further advantages; the land being clean plowed, weeds are more effectually deſtroyed, and the ſoil is better opened for receiving benefit from the froſt and air. This method may likewiſe be reverſed by another plowing. The ſurface may be entirely changed,

changed, and the ribs turned into furrows, and the furrows into ribs *. Theſe

* It will not be improper to ſhow, how this work is to be performed in the moſt exact manner. In order to this, a bridle, or muzzle, muſt be uſed, ſuch a one as is deſcribed in N° VI. Article XXXVI. p. 271. of this work, and the cattle muſt be yoked in a line before each other. Let us ſuppoſe, that the ribs are to be made with four furrows. The cattle muſt be placed in the furrow on the left ſide of the ridge, and the cleek of the ſwingletree on the muzzle to the left of the beam; ſo that, when the cattle are going in the furrow, the plough may go about four or five inches to the right of it. At the land-end, the cleek muſt be placed in ſuch a manner, that when the cattle return in the furrow made by the plough, the earth of the furrow, with the faſt land below it, may be turned back. This done, the cleek muſt be put to the middle of the beam, and the cattle put in the furrow of the ridge, as at firſt. By this the few inches of faſt land, betwixt the furrow of the ridge and the furrow firſt made, will be taken off, and laid up. This makes a rib of three furrows; the fourth is added by the cattle going with the cleek placed in the ordinary way. To begin making the ſecond rib, at a proper diſtance from the firſt, the cattle muſt be put into the furrow laſt made, and the cleek placed ſo far to the left of the beam, that the plough may go about four or five inches from the furrow in which the cattle are going. After the firſt is made, the other three may be made as before directed.

If the ribs are to be made by three furrows inſtead of four, the firſt rib is to be made as before directed; and, when this is done, the plough muſt turn to the furrow on the other ſide of the ridge, and make a rib there in the ſame manner; from thence it muſt turn to the ſide of the ridge where it firſt entered, and there, the cattle going in the laſt-made furrow of the firſt rib, and the cleek placed on the left of the beam, the diſtance of the two ribs from each other is determined, as in the four furrowed ribs. When this is done, the plough muſt go to the other ſide of the ridge; and ſo from one ſide to another, making ribs alternately on each, till the whole is plowed. The reaſon why the plough muſt go from one ſide of the ridge to the other, in making three furrowed ribs, is obvious: Without this there can be no certain way of regulating the diſtance of one rib from another. In this way of making three furrowed ribs, it may be obſerved, that two of the furrows are turned towards the crown of the ridge, and the third towards the furrow. If it is found more convenient to turn the two to the furrow, and the third to the crown, the plough muſt enter in the crown of the ridge, and make ribs on each ſide alternately, till the ridge is plowed out.

If ridges are narrow, and do not divide equally into ribs, two or three of them may be ribbed as one ridge.

These different methods of plowing, the last two excepted, are known to every common plowman, and they should be attended to by every improver, as of importance; without a proper knowledge of them he cannot give directions to his servants, nor prevent them from falling into blunders in the execution, which they are but too apt to do. The ignorance of a master in things which his servants are acquainted with, is attended with bad consequences; it gives them an indifferent opinion of his knowledge of farming, and makes them despise every new thing which he proposes, as absurd and whimsical.

It was observed, that plowmen are apt to commit blunders in plowing. Thus in gathering ridges, if care is not taken in beginning the plowing of the ridge, some firm land will be left in the crown, and the crown itself so much raised above the rest of the ridge, that no seed will ly upon it. It is sometimes observed, that just on the crown of a ridge, where the soil is deepest, there is less corn, and more root-weeds, than in any other part of the ridge. This is certainly occasioned by allowing firm land to remain there in plowing, and by raising the crown like a peak above the rest of the ridge. The plowman, instead of turning back the earth of the first furrow, and the firm land below it, keeps at such a distance, as to lay the earth of the second furrow up to it, or on the top of it. This leaves firm land betwixt the furrows, and raises the crown of the ridge to a peak. But if he is directed to draw the furrows so near, as to turn back the earth of the first in making the second, no firm land will be left, and the earth, that by the other method is thrown upon the crown, will be scattered.

This blunder is oftener committed when flat ridges are cleaved. In cleaving, if the ridges are plowed out, turning the plough always to the left, it is impossible to prevent the two furrows, laid together in the crown of the new ridge, from being at two great a distance, and raised higher than the

rest

reſt of the ridge. When ridges are cleaved in this manner, the earth of the firſt furrow that the plough makes, is turned over upon firm land, and backed by the earths of the other furrows in their courſe. This makes it impoſſible to get at this firm land in plowing the next ridge, without turning up the firm land itſelf, and the earth of the furrow laid over it, upon the top of the earth of the ſecond furrow, by which the crown of the ridge would be raiſed to a high ſharp peak. Now, to prevent this, the plowman, in plowing the next ridge, keeps at a proper diſtance, and does not touch the firm land, over which the earth of the firſt furrow is laid. But it may be obſerved, that he muſt either keep at ſuch a diſtance as to leave firm land in the crown of the new ridge equal to the breadth of two furrows, or he muſt turn the earth of his furrow upon the top of the earth of that firſt furrow. By this the crown of the ridge is ſtill high raiſed, and ſome firm land ſtill left.

But ridges of this kind may be cleaved without leaving any unplowed land, or without raiſing the crown much above the reſt of the ridge. The method of doing it is this: after the plough has made the firſt furrow, inſtead of turning to the left, and making a furrow on the other ſide of the ridge, it turns to the right, and throws back the earth of its firſt furrow along with the firm land below it, and after going round again in the ſame courſe, turns to the other ſide of the ridge, and goes twice round in the ſame manner, after which the ridge betwixt the two *veerings*, as they are called, is plowed out, as at firſt propoſed. When the plowing of the ridge is finiſhed, a new veering is made in the next furrow, by the plough going twice round, as before directed, and then the ridge betwixt the laſt-made veering and the plowed land is plowed out in the ſame manner as before: and in the ſame way the veerings are made till the whole field is plowed. By this method there is no firm land left below the earth of the furrow; and the earth that is turned towards the crown being ſcattered, and not laid all in one place, the crown itſelf is not much raiſed above the reſt of the ridge.

It

It may be obſerved likewiſe, that in caſting ridges, if ca
is not taken, the furrow towards which the earth is throw
will be ſo filled up as to be improper for a drain. The plough
enters the ridge near the furrow, and throws the earth toward
it, turns to the right, and throws the earth from the oppoſit
ſide towards it likewiſe; and then goes in the track of the ol
furrow, betwixt the earths of the furrows made on each ſide
This furrow, towards which the earth is thrown, is ſometime
ſo filled up as to render it improper for a drain. We hav
ſhown how the earth around it is plowed. The furrow whic
the plough makes going in the track of the old furrow, be
twixt the earths of the furrows on each ſide, is called a *gore*
furrow. On the left ſide, the plough having no mold-board
the looſe earth falls back into the furrow behind the plough
and fills it up, or at leaſt makes it unfit for a drain, which i
wet land is a great diſadvantage.

But this may be prevented by proper care; the furrow ma
be made clean, and fit for a drain. The method of doing
is this: The plough enters about two feet from the furrow
and inſtead of turning to the other ſide, returns on the ſam
ſide, turning back the earth, and then goes round again in th
ſame courſe; after this turns to the other ſide of the furrow
and does the ſame going twice round. By this the gore
furrow is made quite clean, and, like the crowns of ridges
formed at about two feet diſtance on each ſide.

Some other things of a like nature might be mentioned
Theſe have been inſiſted upon, to ſhow, that it is neceſſary t
attend to every circumſtance of plowing, that ſo this importan
work may be performed in the moſt proper manner.

ART

ARTICLE LX.

Of the improvement of Moor-grounds—Hiſtory of ſuch Improvements by a common Coallier, *an inſtance of moſt ſpirited induſtry.*

[From YOUNG's Six Months Tour through the North of England, Vol. II.]

AN object the moſt worthy attention is, the immenſe tract of moors which lye to the weſtward, belonging to William Danby Eſq; of Swinton. This gentleman poſſeſſes ſeveral thouſands of contiguous acres, which do not yield him a tenth part as many farthings a year. And as I was particularly attentive to all the accounts I could gain of theſe moors, and rode over and examined them ſeveral times, I can ſay an account of them before you, which is perfectly genuine. I divide them into the following ſorts:

Firſt, The dry moors, to appearance almoſt covered with whinſtone, many of them very large. The ſpontaneous growth, ling * of various height, from one foot to three. The ſoil a light black moory earth, from ten inches to a yard deep, and under that a channelly ſandy gravel.

Second, The ſame in all reſpects as the preceeding, except the ſtones which are but few, and ſcarce ſufficient to build the walls for incloſing.

Third, A dry black moory ſoil as before. The ſpontaneous growth, ling, whins, and brakes.

Fourth, The ſame ſoil, but the ſpontaneous growth whins and brakes.

Fifth, A dry ſoil of a lighter colour, and ſome of the abovementioned black earth: The ſpontaneous growth, a benty kind of graſſy turf. I know not how to deſcribe it. In the North they call the ſoil that bears it *white land*, alſo the ſame ſoil yielding that production, and whins and brakes at the ſame time.

Sixth,

* Heath or Heather.

Sixth, Very wet boggy moors, out of which peat is dug. Th
ſpontaneous growth ſcarce any thing but ſtraggling ſtinte
ling.

Seventh, Ditto, but the ſpontaneous growth turf (*white land*
alone.

Eighth, Dry ſound light loam of various depths, from on
foot to five; the ſpontaneous growths, common graſs alone
or graſs and whins, or brakes.

I am ſenſible that more diviſions might be made of the
ſoils; but the above will be ſufficient to explain my meaning
The wet and dry moors it may be ſuppoſed vary in degree b
gradation, until it may be difficult to pronounce whether the
are wet or dry: and the ſpontaneous growths intermix in th
ſame manner; but the above characteriſtics are to be underſtoo
as marking principally the nature of the land.

All the ſtone hitherto diſcovered is of a very ſoft gritty na
ture, that cuts eaſier than wood: No lime-ſtone.

The experimental knowledge of the nature of theſe ſoils
yet but in its infancy: The moor-ſide farmers have don
ſcarce any thing; but another ſource of ſome valuable info
mation muſt not be overlooked.

A thin ſeam of coal is found under theſe extenſive waſt
and wilds. Mr Danby has a coalliery upon the edge of h
moors, which employs many hands. The cottages of th
coalliers, are ſcattered about at no great diſtance. Each ha
at firſt a ſmall garden, which, from the great foreſight a
refined politics (for I can give the conduct no other name)
their landlord, grew into little farms.

Miners in general, I might almoſt ſay univerſally, are a mo
tumultuous, ſturdy ſet of people, greatly impatient of co
troul, very inſolent, and much void of common induſtry.
Thoſe employed in the lead mines of Craven, and in ma
coallieries, can ſcarcely, by any means, be kept to the perfo
mance of a regular buſineſs; upon the leaſt diſguſt they q
their ſervice, and try another. No bribes can tempt them
induſ

induſtry after the firſt performance of their ſtated work, which leaves them half the day for idleneſs, or rioting at the alehouſe.

Mr Danby, partaking of theſe inconveniencies in common with his neighbours, ſtruck upon a remedy which ſufficiently diſplays his knowledge of human nature.——"If," ſaid he, "I can give theſe fellows a better notion of a local property and happineſs, I ſhall gain a power over them, which I can eaſily turn to their good, and the benefit of their families, as well as to my own convenience."———He executed the thought, and it has ſucceeded to admiration.

Obſerving ſome of the men (that had a little induſtry in them) to cultivate their gardens better than their comerades, he made them an offer of incloſing from the moor a field for each contiguous to their gardens, that they might raiſe their own corn inſtead of buying it. Which was accordingly done, and no additional rent taken for it.

Two or three tolerable examples had great effects: By degrees, others applied for the ſame favour, which was always readily granted; and, in the courſe of ſome years, very few of the cottages remained without a field adjoining. The huſbandry in them was nothing very accurate, but it was of great ſervice to the families, and it anſwered their landlord's purpoſe of rendering them more dependent, though at the ſame time more happy. One fellow aroſe among them (of whom more hereafter) who ſet them an example of much better huſbandry, inſomuch that now there is not a coallier without his farm; each from three or four to twenty acres of land. Moſt of them keep a cow or two, and a gallway: raiſe the corn, &c. they eat; are well fed, well cloathed, induſtrious, and happy. Their time is ſpent at home inſtead of the alehouſe: ——thoſe young fellows, who formerly were riotous and debauched, now marry, ſettle, and become the honeſt fathers of a laborious and valuable race of children. Nothing is ſo much deſired as a little farm; which, being a reward for induſtry and ſobriety, becomes an incitement to a continued

good behaviour: and by this well-concerted conduct, the whole coalliery, from being a ſcene of idleneſs, inſolence, and riot, is converted into a well-ordered and decently cultivated colony: It is become a ſeminary of induſtry; and a ſource of population.——Great is the merit of being ſo offended at vicious habits as to determine their eradication,—to project a ſcheme of reformation, as beneficial to the public as himſelf—to conduct it through all the difficulties of overcoming and changing human nature herſelf—to convert a den of thieves and raſcals into honeſt and induſtrious ſubjects:—this was effected by Mr Danby, and without the violence of a Pope Sixtus:—he planned with the ſagacity of a Machiavel, and executed with the humanity of a Trajan.

But to return to the point in queſtion.

Looking over ſome of the fields of theſe coalliers, and aſking them after their products, I found they all broke up their land by pairing and burning, and ſowed turnips upon it; ſometimes raiſing them as large as a man's head: Oats the next crop, of which they get from forty buſhels upwards; ſixty-five buſhels have been gained from half an acre: a hundred and twenty buſhels of potatoes they frequently raiſe upon the very worſt land. They likewiſe ſow wheat, rye, and maſlin, and get very good crops. But all lay down to graſs as ſoon as proper. They lime it well. Mr Danby is at the expence of walling in any quantity of the moor in fields contiguous to their farms, provided all their former land is well cultivated. They have it ſeveral years for nothing, but afterwards pay a trifling rent, that they may not graſp at more than they can cultivate after their day's work in the mines is over.

The beſt intelligence I gained was, of James Croft, one of the coalliers. But this man deſerves a more particular attention.

Thirteen years ago, he began his huſbandry by taking an acre of moor, which he pared and burnt, ſpread three chaldrons * of lime among the aſhes, and ſowed it with oats, which

* A chaldron is a dry Engliſh meaſure, conſiſting of 36 buſhels heaped up. The chaldron ſhould weigh 2000 pounds.

which he got but an indifferent crop. He next threw in three more chaldrons, planted half of it with potatoes, and ſowed the other half with maſlin; the crops middling. He then limed it again, ſowed it with oats, the crop thirty-five buſhels. After another liming, ſowed it with oats, and gained fifty buſhels. Next he limed it again, and ſowed half of it with barley, and planted the other half with potatoes; the crops but indifferent. He then limed it again, and ſowed oats once more, of which he got forty buſhels; with theſe oats he ſowed hay ſeeds, all he could get together or procure, which was thirty-ſix buſhels. After the oats were off, he mixed ſome lime and earth together and ſpread over the land: the graſs came very finely, and has been exceedingly good ever ſince; and improving every year, it is now worth 20 *s.* an acre: I viewed it attentively, and think it well worth the rent.

This firſt eſſay was very ſpirited, but not carried on upon principles which can be altogether approved of: Indeed it could not be expected that a poor coallier ſhould ſtrike at once, and without any experience, into an accurate and correct huſbandry.

His next effort was upon an addition of eight acres, which however was too much for him to improve at once, but he effected it all by degrees. Theſe acres were exceeding ſtoney, ſo that after a diviſion by walls built out of them, many remained; one acre coſt him two months to clear and fill up the holes. Some ſingle ſtones required near a week. Laborious as the work was, he completed it by degrees, and pared and burnt the ſoil: He threw theſe lands into a better huſbandry (though not totally defenſible) than what he uſed before. His method was, to ſow turnips upon the pared and burned land, after liming two chaldrons *per* acre: It coſts, by the time it is on the land, 14 *s.* 6 *d.* a chaldron. The turnips are generally worth from 20 *s.* to 30 *s.* an acre. He draws and ſcatters them on his graſs for his cows and young cattle.

After

After the turnips he plows four times, lays on two chaldrons *per* acre more of lime, and ſows oats, eight buſhels *per* acre; the crop varies from forty to ſixty buſhels.

After theſe oats, he ſows four more ſucceſſive crops of them; for each of which he plows three or four times, and alſo limes at the rate of two chaldrons *per* acre. The average of theſe crops is forty buſhels *per* acre. With the laſt he lays down to graſs, by ſowing plenty of hay ſeeds.

This has been his general courſe, but ſometimes he has ſown rye, of which he generally gets thirty-two buſhels *per* acre. Potatoes he has regularly cultivated; ſets them in rows two feet aſunder, and one foot in the rows; in which manner thirteen buſhels plant an acre; the mean produce is a hundred and fifty-eight buſhels.

Two years ago, he took in eight acres more, on which he is now hard at work. It is aſtoniſhing with what perſeverence he attacks the moſt enormous ſtones, cutting them in pieces, carrying them away, and then bringing mold to fill the holes up; and he has ſuch an idea of neatneſs, that he will not paſs one.

He has five acres of graſs; his management of which is very good: He lays all the dung he can raiſe upon it, mixed well with lime; and ſometimes with good earth. And this dreſſing he repeats every third year, without ever failing. His ſtock of cattle is three milk cows, a heifer, and his gallway; their winter food hay, turnips, and ſtraw. Two acres of commonly improved graſs (from moors) he reckons ſufficient to ſummer-feed a cow, but an acre and an half of *his* will do. He makes ſix pound of butter *per* cow *per* week, twenty-four ounces to the pound, for three months, and four pound the reſt of the ſummer. And each of his cows eats an acre of hay in the winter. He has not yet had enough of his own for them, buying ſome, but hopes ſoon to effect that.

Beſides the mere huſbandry of his fields, he has done ſomething in the ornamental way; having almoſt ſurrounded two

of

of his cloſes with a young plantation of firs and other trees, which thrive extremely well.

Attentive to every object that can render his little farm either profitable, convenient, or agreeable—he has with no light trouble directed a little rill of water from the moors through his fields; by which means he not only has water in every field for his cattle, but can alſo water ſome of his graſs, and thereby fertilize it much.

Were I to dwell upon every circumſtance of this coallier's huſbandry, I ſhould be afraid of tedioufneſs; but I ſhall not conclude, without attempting to give you ſome idea of the MAN, as well as his *farm*.

I have ſhewn you how he has managed for ſeveral years above nine acres of land, much of it always in tillage, and ſome conſtantly freſh breaking up, and improving:——we have found him cropping his land ſeveral years ſucceſſively, a practice though bad, yet of increaſing labour) never ſowing any without a previous ample liming, and three or four plowings;——adding to his cultivated land, by perfectly clearing the freſh ſoil from all ſtones, ſome of them an enormous ſize, of many tons weight: and by paring and burning, in the moſt ſpirited and laborious manner.——When you conſider theſe circumſtances, and that at the ſame time he has had the courage to attack eight acres more,——will you not conclude he has received much aſſiſtance, either of money or labour; or that many favourable circumſtances, hitherto unrelated, have enabled him to make ſuch advances in ſo ſpirited a conduct?

But the very contrary of all this is the caſe. His work in the coalliery has been regular, equal in every reſpect to the other men, and in ſome ſuperior: His hour of going to the mine is twelve o'clock at night, the work is over at noon the next day. The remainder is all the time he has had to perform what I can ſcarcely call leſs than wonders: Nor has he ever received the leaſt aſſiſtance of any kind, or ever expended

one

one ſhilling in hiring the labour of another man. The quantity of lime he has laid on his land is very great, and much more than what is commonly uſed by the neighbouring farmers; the number of plowings he has given his fields is equally ſuperior; and yet all this labour has been performed with a ſingle gallway;—the lime brought ſix miles. It is aſtoniſhing what a ſpirit of perſeverance muſt have actuated this extraordinary man, to execute, with ſuch ſlight engines, works that will put many farmers with teams to the bluſh.

Some aſſiſtance in weeding potatoes in harveſt, &c. and ſuch ſlight work, he has received from his family; but you may ſuppoſe it not conſiderable, when I tell you, that, of four or five children, he has only one ſon about fourteen years of age, who works with him conſtantly in the coalliery.

From the time of leaving off work in the mine, till that of ſleeping, he regularly ſpent in unremitted labour in his farm. Since his beginning he has never had more than four hours ſleep, and, of moon-light or bright ſtar-light nights, ſeldom ſo much. The regular ſevere fatigue of twelve hours labour in the coalliery has not been ſufficient to bow down the ſpirit of this poor fellow;—he applies the remainder of the day, and even ſteals from the night, to proſecute his favourite works of huſbandry—that is, to make up his hours of work *twenty*, out of the twenty four.

Such a conduct required a genius of a peculiar caſt. Daring in his courage, and ſpirited in his ideas, the moſt extenſive plans are neither too vaſt nor too complicated to be embraced with facility by his bold and comprehenſive imagination. With a penetration that ſees the remoteſt difficulty, a prudence and firmneſs of mind that removes every one, the moment it is foreſeen; we attribute the wonders he has performed to the powers of his mind, and forget almoſt that the whole which is executed of his ideas, has been the work of his own hands. The ſevereſt fatigue, the moſt aſſiduous labour have been unable to quench the fire of the one, or repreſs the vi-

gou

gour of the other. The greateſt, and indeed the only object of his thoughts, is the improvement of the wilds that ſurround him; over which he caſts an anxious, but magnanimous eye, wiſhing for the freedom to attack, with his own hands, an enemy, the conqueſt of whom would yield laurels to a man of ample fortune.

I aſked him, What he would do if he had his whole time to apply to his farm? "I would perform ſomething:" ſaid he, "at preſent I do nothing." Hinting to him that I would mention to Mr Danby, the releaſing him from the coalliery, that all his time might be applied to farming,———his countenance was animated at the very idea,—his eyes ſparkled with pleaſure.

Upon my aſking him, if he did not think every part of the moors were highly ſuſceptible of improvement—"Improvement! Sir," he replied with eagerneſs, "there is not an acre but might be made as good land as a man would wiſh to farm."

Upon my aſking him further, if he thought he could improve a larger tract than was within the power of one pair of hands, by having other men, horſes, and carts, &c. put under his direction? "Aye ſure," he replied, "for it is nothing more than extending the proportion of ten acres to a great number. It would be hard indeed, Sir, if a man that had improved ten acres with his own hands, could not direct the improvement of an hundred or a thouſand."

What would you do, if any unthought-of accident gave you an hundred pounds? "Lay it all out in the improving land."

I had a long converſation with him upon theſe ſubjects; and found him very ſenſible, ſpirited, and moſt enthuſiaſtically devoted to the improving of moors. His ideas are clear and ſhining; and though his language is totally unrefined, and provincial, inſomuch that ſome attention is neceſſary to comprehend the plaineſt of his meaning, yet whoever will take the pains to examine him, will find him a genius in huſbandry: A diamond of the firſt water, but ſo buried in the obſcurity of the mine, as to be ſcarcely diſtinguiſhable from the vulgar rubbiſh that ſurrounds it.

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The view of this remarkable man's little farm, and the conversation I had with him upon the improvement of moors a point of such vast importance in this country, prejudiced me so much in his favour, as to make me wish it were possible to enable him, not only to add greatly to his farm, but to conduct the culture of it upon a spirited plan.

I mentioned it to Mr Danby, (who had at first introduced me to him as an extraordinary fellow) and he agreed with me that his being a coallier spoiled a good farmer, adding, that he had thoughts of giving him more land, and also releasing him from the coal-mine. This gave me much pleasure, not doubting but so spirited a mind, with a body so active and vigorous, would alone do wonders.

But having since reflected further upon the effects which might be drawn from the labours of this poor but most industrious fellow, I cannot but think it much to be regretted, that the nation at large should lose the benefit that might be made to result from the labours of a genius in the most useful way of all others.

In a word, it is greatly to be wished, that the man might be supported in such a manner, as to enable him to do something more than is possible for his own hands to perform. In his confined a situation, he must unavoidably be under such difficulties as will not allow him to set the example he would were his endeavours extended to a larger sphere.

Had this man (by prudent and gradual additions) servants horses, carts, implements, in a word, the whole stock of a farm given him, and fifty, sixty, or a hundred acres of moor-land added by degrees, with barns, stables, &c.——or fixed properly in a very wild bad moor-farm, (for I would never give him good land to cultivate), I have no doubt but he would set an example of improvement, that would have excellent effects upon this uncultivated region; and convince those who doubt of the profit of cultivating moors, that no method whatever of expending money is so highly advantageous.

[*To be continued.*]

ARTICLE LXI.

The moſt natural and eaſy method for a Farmer to acquire experimental knowledge—The manner of propagating the Hawthorn from the ſeed, and of raiſing them to complete Fences —Of the Siberian Barley.

[In a Letter to the Publiſher.]

Be gracious Heaven! for now laborious man
Has done his part. Ye foſtering breeſes blow!
Ye ſoftening dews, ye tender ſhowers deſcend!
And temper all, thou world reviving Sun,
Into the perfect year. THOMSON.

THE hurry and buſtle of ſeed-time, Mr Printer, is now at an end, and the Farmer, whoſe hand was ever buſy reducing the ſtubborn ſoil, or ſcattering the ſeeds of vegetation in the ground, can now view, with a pleaſure peculiar to the proſpect, theſe very fields adorned with a lively green, and ſo far bidding fair for a plentiful harveſt. But this flattering appearance by no means renders him unactive: Plowing his fallow ground, hoeing his bean-crops, planting cabbage, weeding hedges, &c. are now the objects of his care and induſtry. For managing theſe, he has but to iſſue proper orders, and now and then direct the labourers in the proper performance of them. He might now indulge himſelf with ſleep every morning till eight or nine, which the yawning arms of ſloth ſeem to think indiſpenſibly neceſſary to health; but beſides the attention which is proper to be paid now and then to the operations of the field labourers, the delightful morning ſcenes are to him ſufficient inducement, to quit the bed of ſlumber; and, as the celebrated poet ſays,

——— Enjoy
The cool, the fragrant, and the ſilent hour,
To meditation due and ſacred ſong.
For is there ought in ſleep can charm the wiſe?
To lie in dead oblivion, loſing half
The fleeting moments of too ſhort a life?
Total extinction of th' enlighten'd ſoul!

Or elſe to fev'riſh vanity alive,
Wilder'd and toſſing thro' diſtemper'd dreams;
Who would in ſuch a gloomy ſtate remain
Longer than nature craves?

The crop in this part of the country *, as I have alrea hinted, has really a very good appearance. The ſpring w uncommonly mild till March 26th, when both corn and gr looked well. From that to April 23d, the weather was col and ſometimes ſtormy, with ſmall ſhowers of hail; but t firſt four days of May actually reſembled a December, or January. Upon the 2d of May, we had a fall of ſnow whi continued even here all that night and part of next day, wh the cold was extremely ſevere. Hence that yellowneſs in t wheat, which is a certain ſign that it never will be ſtron The ſeaſonable ſhowers, however, which we had on the 17 ult. have recovered it ſurpriſingly. Juſt now all the oth crops, and alſo the graſs, look remarkably well. I wiſh, S I have not made too free with the SCOTS FARMER, when mentioned the appearance of our crops; but, if it is take amiſs, I ſhall beg pardon, and never do it again.

I muſt now ſpeak of what I had principally in view when firſt ſet out: and that was, *firſt*, The moſt natural and ea method for a Farmer to acquire experimental knowledg *2dly*, The manner of propagating the Haw-thorn from th ſeed, and of raiſing them to complete fences. And *laſtly* of ſome qualifications peculiar to the Siberian barley ſo late imported into this iſland.—I ſhall ſtudy brevity as much as po ſible in diſcuſſing each of theſe points.

As to the firſt then, which was to point out th moſt natural and eaſy method for a Farmer to acqui experimental knowledge; all I would adviſe is, that h would keep an accurate journal of all his tranſactions i the field, and likewiſe, at leaſt, the general diſpoſitio of the weather, in order that he might be able to diſcov the advantages and diſadvantages of the different metho which he practiſes, either through choice or neceſſity, in an

* Eaſtern parts of Eaſt-Lothian.

his operations. I would not adviſe the common Farmer to y coſtly experiment, without the higheſt probability of ſuc-ſs; but ſince, in the ordinary courſe of his buſineſs, he is liged often to uſe very different methods of managing the ne field, &c. according as the weather and other cir-mſtances direct, I think the trouble of committing them paper needs hardly be mentioned; eſpecially when we con-er, that it is the ſure foundation of that knowledge which the diſtinguiſhing characteriſtic of the practical Farmer. is, it is true, is no new method; but, beſides that I do not end this for the lovers of novelty, I think it is not the leſs ful of being old. It would be unneceſſary to adduce inſtan-of knowledge having ariſen from ſuch and ſuch obſerva-ns, as I think the method of acquiring it in this way muſt obvious to every body.

I ſhall therefore go on to what I propoſed in the ſecond ce, which was, to point out the manner of propagating haw-thorn from the ſeed, and that, without mentioning advantages of incloſing, which your correſpondent, A. T. think it was) [N°. V. p. 242.] has already done. The y muſt be gathered about the end of harveſt when ripe. ey are only to be got in great plenty upon old hedges. A ot of theſe is generally bought here at 6 s. 8 d. or 8 s. *per* . When thus obtained, they muſt be buried * in the au-n in pits dug for that purpoſe, till the autumn or ſpring fol-ing. At any of theſe times the pulpy ſubſtance is quite ed from off the ſtone, when they may be ſown on beds of ched-ground, where they make their appearance by a ſmall ot, the ſpring of the enſuing year. The time they require his: If they are ſown autumn 1773, or ſpring 1774, they make their appearance on the ſpring 1775. This year they ſt be carefully keeped clean from weeds. In the ſpring

(March

* It is a practice with ſome to expoſe them all the firſt winter in large pact heaps, and then to bury them in the ſpring following. This y think makes the pulp rot much ſooner, and the ſtones more ready ſowing in their ſeaſon.

(March is beſt) 1776, they muſt be thinned by tranſplanti
many of them into other ground well trenched. When the
tranſplanted ones have ſtood till autumn 1776, or ſprin
1777 they may be tranſplanted into hedges, and they will
very well, if carefully cleaned; but beyond diſpute, a two
three years tranſplanted thorn will do better. At two ye
old, I think a thorn preferable to thoſe taken from ſix or eig
year old hedges. The one will do well in any caſe, the oth
is not ſo certain, unleſs the ſituation is very moiſt and w
When they are taken from the nurſery, their roots and ſm
fibers ought to be cut ſhort, and the tops entirely off the
When the ditch is caſt out, and the hedge-bed made rea
which ought to be made in ſuch a manner, that the thor
may point over the ditch, making an angle of 45° with the h
rizon, i. e. that they may be in a half ſtanding poſture.
ter planting there is nothing neceſſary but cleaning them w
This ought to be done according as the weeds appear; firſt,
April or May; ſecondly, about Midſummer; and laſtly,
Lammas. Theſe three weedings are found of vaſt importa
where the land is rich and light, but has not been fallowed
To raiſe a crop of potatoes or beans upon the back of the di
for two or three years, is of great ſervice to the hedge, beſi
the thriſt of it. If it is poſſible let the land continue in till
till the hedge is fencible; and ſheep ought never to get n
them till then. To ſuffer either theſe or cattle to eat up
them, is doing them the greateſt injuſtice. To allow them
run up without interruption, is reckoned the beſt method
making a complete fence; becauſe, when they are at a pro
height, the plaſhing them, or laying the big branches half
through near the root, acroſs ſome others left ſtanding, rend
it impenetrable to any beaſt however fierce or unruly. Th
rows of this croſs-lying wood is ſufficient for any fence.
hed

* Any body having a mind to incloſe firſt opportunity, had much b
ter, I can aſſure them, delay it till the following ſeaſon, and in the m
time fallow the land intended for that purpoſe. This, beſides ſav
the expence of weeding, raiſes them much ſooner to complete fenc
[No. II. p. 85.]

hedge has been neglected, and hence become open below, and bushy above, as is always the case, the best remedy for it in the world is this, Cut it close by the ground with a sharp ax, or other instrument, and dig about, and clean it carefully; this will make it a good fence in three or four years.

I now come to the last thing proposed, which was, to point out some qualifications peculiar to the Siberian barley; and, in short, they are these: *1st*, Its making good bread. *2dly*, Its weighing well. As to the first, I really think, that when mixed with wheat flour, in the proportion of a hand-waved peck of Siberian meal, and the heap completed with wheat flour, that it deserves the preference to course wheat bread: but though I am pretty certain, that it has an agreeable relish, and that it would be much esteemed by many on that account, yet as there is no saying how it may be generally liked, I have sent you along with this a piece of the bread *, which you may taste, and let us know your opinion of it, and, if you find it convenient, may hand it about with your next Number to your readers; so that if it answers this character, it may be quickly propagated. But besides this, the real substance which must be in this grain, as shall appear immediately, must undoubtedly be another weighty circumstance in its favour. Upon trial it is found to exceed the common barley no less than 2lb. weight *per* firlot. They are both sufficiently reduced to pot-barley; but as the Siberian is a large plump naked kind of grain, it does not require so much dressing in the mill as the other sort. From hence may we not safely conclude, that since this is evidently opposing the more firm and solid parts of the Scots barley to the Siberian, that the excess would be still greater, if compared when just come from the fanners sufficiently dressed. It would be unnecessary to mention, as a qualification peculiar to itself, the mighty increase which some-

* The bread received by the Publisher had a very sweet taste; but handing it about would not be so convenient. The character given of it by the writer of this Essay should be sufficient inducement for others to make the trial, when they will be able to judge both of the quality and produce of this grain.

ſometimes ſucceeds to a careful cultivation of this barley. I confeſs indeed it ſtools wonderfully; but this needs be no matter of ſurpriſe, when we conſider what wonderful crops of our own barley we raiſe by the ſame management. I cannot help mentioning in this place, how fooliſh and inconſiderate it is for a Farmer to blow about any extraordinary increaſe he may have at a particular time, upon but, perhaps, a rood of land. Let him conſider, that this is a very partial trial; yet nevertheleſs ſufficient to raiſe the value of his own and his neighbour's land too high in the opinion of the landlord. We may inveigh with much warmth againſt that ſpirit of tyranny and oppreſſion which prevails amongſt the proprietors of land, and perhaps in general with ſome degree of juſtice; but certain it is, if we trace this evil to its true ſource, we will find it to be in the Farmers themſelves. How eagerly do they graſp at every little bit of land which the news-papers point out, and that too very often whether they need it or not! frankly giving in their extravagant propoſals, the very means ingeniouſly contrived by the Lairds to make them tools to one another! Let the Farmer conſider himſelf in the landlord's place, and then imagine how he would act. Would he not employ a F——s, or ſome flattering ſycophant, to determine the value of his land; and then, with an undiſtrubed conſcience, and unfeeling heart, ungenerouſly take the advantage of the Farmer's madneſs, who, to ſatisfy a fooliſh ambition, will thus wantonly ſacrifice the peace, and perhaps the independence of his family? I am, Sir,

Eaſt-Lothian, Yours, &c.

June 4. 1773. ARATOR.

P. S. Though I have laid down the method of propagating the haw-thorn, I am aware that it cannot be of ſervice to thoſe who intend to incloſe immediately. I therefore mention Mr Wilkinſon, nurſery-man at Dunbar, as a very proper perſon to ſupply, with very good thorns of different ages, all who can conveniently take them from that quarter.

ARTI-

ARTICLE LXII.

Of Store Farms.

[In a letter to the Publiſher.]

HAVING in my laſt [N° VII. p. 326.] laid before you my opinion, with reſpect to the management of the arable part of a ſheep or ſtore farm, I ſhall in this lay before you a few of my ſentiments upon the management of the ſheep or ſtore part. And, in the firſt place, it is abſolutely neceſſary that the ſtoremaſter beſtows his utmoſt attention in looking out for, and engaging proper perſons to attend his flocks, as his future ſucceſs depends in a great meaſure upon a judicious choice of ſhepherds. He ſhould, in the next place, make a diviſion of his ſheep into flocks or hirſels, which, if a farm of any conſiderable extent, ſhould conſiſt of three diviſions; namely, the ewes to go by themſelves; the wedders, dinmonts, and gimmers, to compoſe the ſecond diviſion or hirſel; and the lambs or hogs the third. The ſtoremaſter ſhould then make a diviſion of his farm, and allot to each hirſel that part that is beſt adapted for them; namely to the ewe-hirſel, from the beginning of April to the end of June, the richeſt paſture and the beſt ſheltered part of the farm if poſſible to be obtained; then after that period, one third part of the foreſaid paſture to be taken from the ewes, and reſerved for the lambs; the moſt highland part of the farm and courſeſt paſture to be allotted for the yeld-ſheep-hirſel all ſeaſons of the year. I ſhall now give my opinion, with regard to the management of the lamb or hog-hirſel, and as the improvement of the breed of ſheep depends chiefly upon the right management of this hirſel, I ſhall be the more particular upon this article: And the firſt ſtep neceſſary to be taken in order to improve the breed is, to be very attentive in making a right choice of lambs for propagating

the

the ſpecies; and in ſo doing, I would adviſe always to give the preference to the moſt thriving and ſtrong made lambs they can pick out, provided their wool is good; for the ſtoremaſter, in my opinion, ought always to have the improvement of the wool in his eye as well as the ſheep, and for this purpoſe it would be neceſſary to ſearch out for the beſt kinds of ſheep bred in the country, and to purchaſe a few of them for the improvement of the breed. The next thing to be conſidered with reſpect to this hirſel is the weaning, and what I would recommend with regard to this artiele, is, that inſtead of ſending them to the moſt highland parts of the field to birn, as is generally practiſed by moſt ſtoremaſters I know, I would give them three or four weeks the beſt paſture the farm could afford, and then after that time they may be removed to the birn, for then the heath will be in its full bloom, and will afford excellent paſture, if it has been ſaved or hained for ſometime before they have been put upon it. But at the ſame time, I would adviſe, if it could be attained, to give them each day a little paſture upon graſs or white ground as they call it; then after they have continued as above for five or ſix weeks, they are to be removed to another paſture taken from the ewes paſture as above, which, being ſaved all this while, will afford excellent paſture for them; and if the ſtoremaſter will adopt the plan of management I laid down in my former letter, he will have the hay foggage of his arable to add to it, which will make a fine paſture for them through the winter until the firſt of April, when they are to be removed to the yeld-ſheep-hirſel. The next thing that falls under our conſideration is, ſmearing or laying, which is differently practiſed according to the different cuſtoms and different climates where it is uſed, ſome laying heavier, others lighter; however, my opinion is, at a medium, that one pint of good tar, with two pounds of good butter, will lay ten hogs of twelve old ſheep, ſo as to keep ſafe from ſcab if it is carefully laid on; but I am pretty certain that in general there is a great deal more uſed; and one reaſon perhaps may be this, that it is cuſtomary to have two, three, or

more

more ſmearers ſitting together, and they generally hurry one another ſo much, that they are not at the trouble to make as many ſheds as is neceſſary to put the tar in, or yet to draw up the tar upon the ſkin ſo properly as it ought to be, but leaves a great deal of it among the wool, to the great detriment of it. Another cuſtom prevails among ſome ſtoremaſters, which is, that of marking their ſheep with pitch or tar, which, in my opinion, is not a good one, as it entirely ſpoils the wool upon that part whereon it is applied, and likewiſe gives the innocent and uſeful creatures an additional burden to carry through the whole ſeaſon. They might, in my opinion, fall upon a great many methods to mark their ſheep beſides the above, which would neither burden the ſheep nor ſpoil the wool; ſuch as cutting their ears in different forms, or by marking their faces with a burning iron in any faſhion they pleaſe, ſo that they may eaſily diſtinguiſh them from thoſe of their neighbours; and if they chuſe to know, (as every good ſtoremaſter ſurely ought) their different kinds of ſheep, they may be diſtinguiſhed by applying upon different places, a certain kind of mineral called *keel*, very well known to ſtoremaſters. There is another cuſtom prevails among a great many ſtoremaſters, which I think proper to take notice of in this place, and that is, pizzling or keeping their rams or tups back from their ewes, in order to prevent their having too early lambs: now, the method I would recommend, inſtead of that, would be this; that every ſtoremaſter, if he does not chuſe to incloſe his whole arable, ſhould at leaſt have one ſmall incloſure ſufficiently fenced to put his rams in, during the period he wants to keep them from his ewes; he will find it greatly turn to his advantage, as his rams will be in a great deal better condition upon account of their going at their eaſe, and not ſuffering them to abuſe themſelves and ewes unneceſſarily; and in conſequence of their good order, a great deal fewer will ſerve the purpoſe. I would likewiſe, in this place, take notice, that the want of Stells or places of ſhelter is a great loſs to ſtore farms; and where that

is the caſe, I would recommend to the proprietors of ſuch farms, to plant thickets of firs upon the moſt convenient places of the farm, proper regard always being had to a dry ſituation; the landlord to be at the expence of planting and incloſing, the tenant to furniſh the ground without any allowance, provided his leaſe is ſo long as that he may expect the benefit of it for ten years to his flocks; and if not, the landlord to pay him in proportion to the advantages or diſadvantages he may receive from it. In laying out the ground, if the ſituation will admit it, they ought to be round, and as much ground not planted in the middle, with proper avenues leading to it, as will be ſufficient to hold the whole flocks eaſily, and likewiſe room to feed them.

Now is the ſeaſon for conſuming the hay ariſing from the arable, and this is the purpoſe it was allotted for in the former letter. The ſtoremaſter is now deſired to diſtribute his proviſions with a liberal hand; the neglect of which has ruined many, by not providing proper food for their flocks, and likewiſe by neglecting to beſtow it upon them until they were not able to uſe it; and it is my opinion, if proper places of ſhelter provided, and plenty of hay beſtowed, that, debarring accidents, there would not be the one half of the loſs ſuſtained by the inclemency of the weather that there generally is.

I ſhall now give my opinion, whether milking of ewes is profitable or not: and from my own experience, can aſſure you it is of great advantage to the ſtoremaſter, and no leſs beneficial to the public; as from that ſource there flows to the poſſeſſor a handſome ſum for his butter and cheeſe, and in conſequence thereof, affords the public a ſupply of that uſeful commodity, the dearneſs of which of late has fully evidenced to be very much needed. But at ſame time, I would deſire them to be milked under the following limitations: In the firſt place, I would recommend wooden or flaik bughts, as it keeps the milk more clean, and likewiſe admits plenty of air into the ews, when in it: And, in the next place, the ewes ſhould not be milked

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above eight weeks, or two months at fartheſt; and likewiſe the ſtoremaſter ſhould be ſure to keep proper paſture for them all the while, as the neglect of paying proper attention to this article has hurt many. I never could obſerve ewes, in the courſe of my experience and obſervation, that were yeld or not milked, produce better lambs next year, than thoſe who were milked if managed in the above manner. I ſhould now give my opinion upon the diſeaſes incident to ſheep, their cauſes and remedies, but as that has been already done to good purpoſe by your valuable correſpondent Mr P. P. [p. 190—238—231.] I ſhall paſs it over, only with this obſervation, that of all the remedies he propoſes to be made uſe of, that of the ſmall incloſure by way of hoſpital is, in my opinion, the moſt eligible; for I am perſuaded that there are few diſeaſes but what are more or leſs infectious, and the only method, in my opinion to prevent it ſpreading, is immediately to ſeparate the diſeaſed from the whole.

I am, Sir,

May 28th, 1773. Yours, &c.

A. T.

ARTICLE LXIII.

Of deſtroying the Worm in Ground.

[In a letter to the Publiſher.]

BY virtue of your invitation to correſpondents to help forward your laudable undertaking, I take this opportunity, to inform you, of an experiment I have made, and with pleaſure and profit can aſcertain the good effects of it.

I have for theſe twelve years laſt paſt made farming my whole ſtudy, and have obſerved, amongſt other nuiſances and enemies to vegetation, a ſmall inſect or worm about $\frac{3}{4}$ of an inch long, and ſo hard, as with difficulty it can be bruiſed betwixt the finger and thumb. The way that it deſtroys the corns, is immediately after the breard is through the ground, it

it gnaws or eats a hole in the plant, a little below the ſurface of the ground, and there ſucks out the whole juices that it contains, until at laſt the leaves decay and ſometimes die; ſometimes there are new ſhoots, but they are ſo long of coming forward as to be almoſt good for nothing. At laſt, dire neceſſity, the fruitful mother of invention, made me exert myſelf, that if peradventure ſome proper expedient might be fallen upon to get rid of ſuch voracious peſts to vegetation. I tried ſundry receipts, ſet forth by our quackiſh ſpeculative farmers, ſuch as ſoot, lime, water, &c. but all proved unſucceſsful. At laſt, I thought upon the following effectual method, viz. to ſtarve them to death, which I executed by a thorough ſummer fallow. I know, ſome will ſay they have ſummer fallowed theſe many years, and have not got them extirpated; that I believe, and doubt not but they will encreaſe, if they do not take the method that I did, viz. as ſoon as the crop was off the ground intended for fallow, I immediately plowed it as deep with a cleaving furrow, as the plough could go, and the ſtaple admit, ſo that little vegetation took place all winter. Then early in the ſpring harrowed it, and carefully gathered up all the weeds that could be got; then croſs-plowed it; then about a month after, harrowed, rolled, and gathered more weeds, and ploughed again; and continued that way all ſummer, only allowing, betwixt plowings, as much time as the ſeeds of weeds might vegetate. This I continued to do, untill the whole vegetable ſubſtance was brought to a ſtate of putrefaction, after which time there is no food left for ſuch vermine, ſo of conſequence they died, as evidently appeared next crop, where not one ſingle plant ſeemed to be hurt, but all luxuriant, as was alſo the graſs thereafter, from graſs ſeeds ſown.

If this true and genuine account is thought to be of any uſe to thoſe who have ſo bad neighbours on their farms, you may publiſh it; if not you may find out a better, and make the proper uſe of this that is made of ſuch waſte paper; if this is found

ound acceptable, after a full ſcrutiny, you may probably hear ore on ſome practical experiments. Meantime, I am,

From the ſunny ſide of Benduphigh, Yours, &c.
June 5th, 1773. PLOWMAN.

P. S. I hope the above may induce others to give an account of what experiments have been made of the deſtruction f theſe animals.

ARTICLE LXIV.

f a proper rotation or courſe of Crops, both for Kerſe and Dry-field Farms.

[In a letter to the Publiſher from an actual Farmer.]

AS my farm conſiſts both of Kerſe and Dry field grounds, I have naturally turned my thoughts upon the diffe- nt management they require; and from experience and ob- rvation I am convinced there is nothing more important for oth of them than a proper rotation or courſe of crops, nor y thing in which our imperfect agriculture more palpably ppears.

The following is what appears to me the beſt and moſt fru- l courſes, and which I am reſolved and have begun to fol- w; but as I propoſe it rather as a project than the reſult of al practice, I ſubmit it to the cenſure of your readers; in pes if there is any thing wrong in it, they will obſerve it, d correct the errors, both for my information, and that of hers.

The Kerſe grounds I propoſe to divide into ſeven lots divifions; 1. Barley, 2. Clover, with a little rye-graſs, Wheat, 4. Beans, 5. Barley, 6. Oats, 7. Cabbage or fum- er fallow. And I apprehend that a farm of fifty acres of erſe land, under this rotation, may be eaſily managed with ree ſervants and four horſes.

1. The

Firſt, The barley ground I propoſe to be put in good con-
dition; and ſown with 20 lb. of red clover, and one buſhel o
beſt Engliſh rye-graſs per acre.

Second, The crop then is graſs, to be either cut green or mad
into hay; and as the greateſt part is clover, there will be no temp
tation to let the hay ſtand too long for the ſake of the rye-gra
ſeed, as it will not be worth threſhing. The hay therefore ſhoul
be cut as ſoon as it is ready; and that no time be loſt for the a
ter-operations, as ſoon as barley-ſeed time is over, the one ha
of the dung of the whole farm, which ought to be reſerved fo
that purpoſe, ſhould be carried out to the end of the hay-field, i
order that ſo ſoon as the graſs is cut, the dung may be imm
diately ſpread on the field. And that this work may be ſti
more expeditiouſly managed, the whole hay, ſo ſoon as it
fit for the hand-coil ſhould be raked on to every fifth ri
that the dung may be ſpread on the other four. The tramp
ruck, ſhould be placed on the middle of the fifth rig, whe
two horſes and two men with ropes and long bridles, ſo as
admit the driver to lay upon the coil while the horſe dra
it along, will be ſufficient to keep ſix or ſeven men buſily em
ployed at the tramp-rucks, and raking the field. When t
hay is got into the tramp-ruck, that rig ſhould alſo be dunge
and although the dung be but very thinly ſpread, it will ha
a very good effect, and in a very ſhort time it will be quite c
vered over by the after-growth of the clover, which wh
about twenty days old, ought to be properly plowed dow
The wheat ſhould not be ſown ſooner than about twenty da
after plowing; for at that ſeaſon of the year, the influence
the ſun and air will be a great improvement to the new plo
ed field, and communicate a good deal of richneſs to it.
this may be got done, if no time is loſt betwixt hands, ſo as
have the wheat ſown in the time of harveſt, before the h
ry of carrying in the corns comes on: and thus you are cl
of the hay-field and wheat-ſeed without interfering with
harveſt work.

The fourth crop in courſe is beans, which ſhould be drilled, the field being firſt thoroughly plowed and harrowed; and, if the rows are put at ſuch a diſtance as to admit a one horſe-hoe plough, it will be a great advantage both to the preſent and ſucceeding crops.

The fifth crop is barley, which will need no dung: and the ſixth is oats, for the purpoſe of meal to the two ſervants, (for the third ſervant mentioned above ought to be a barn-man to threſh at ſo much *per* boll,) and the remainder for the horſes and other cattle. Theſe two ſervants who are employed with the horſes, ſhould clean and red the barn every morning and mid-day, while the horſes are feeding. Two good horſes are ſufficient for one plough, and the plowman to drive them, if the ground is in ſeaſon: but if a ſudden drought ſhould happen, all the four horſes may be yoked together; and thus the Farmer is never diſconcerted, having only fifty acres for four horſes; and ſo in proportion whatever the extent of his farm may be. And by this method a great ſaving is obtained, far beyond the ordinary method of working with four miſerable horſes and a trifling driver.

The ſeventh and laſt in courſe is cabbages, which will in a great meaſure be a ſummer labouring, and will not hurry the Farmer at ſeed-time. If it is thought, that the other half of the dung is not ſufficient for the whole of this diviſion, the one half of it may be ſummer-fallowed; and as to lime, let it be applied to the fallow and cabbage-field. And ſo we come to barley again for the firſt of the ſecond rotation. And in this method I am perſuaded the ground will be always kept clean and in good heart, and much cheaper managed than in the ordinary way.

The dry-field farm ought to conſiſt of a greater quantity of ground, and ſhould be divided into eight lots or diviſions. 1. Barley, laid down with 20 or 25lb. of clover, the half or two thirds red, and the other half or third of white or yellow clover,

clover, with two buſhels of rye-graſs *per* acre; or, if thought proper, with a mixture of other ſorts graſs of ſeeds, as it is propoſed to be paſtured. When the hay is cut, and the ground cleared, the foggage ſhould be but ſlightly eaten, and that only in dry weather: and then hained all winter, and paſtured for the next two years. This will bring you to the fourth lot; and as one ſuch lot ſhould always be coming in, and another going out, the field that has got the two years paſture, ſhould alſo have the half of the dung laid on about the ſame ſeaſon as in the kerſe land, and plowed at the ſame time, and in the ſame manner for wheat, which makes the fifth courſe. After the wheat, peaſe or beans for the ſixth lot; and oats for the ſeventh, the oats to be applied to the ſame purpoſes as in the kerſe farm.

The eight and laſt muſt be turnips, to which the other half of the dung muſt be applied, and after the turnips, barley, which brings the Farmer to the beginning of the rotation: and this courſe will be performed with as little, or rather leſs expence, than that of the kerſe farm, if the ground does not lie too much up-hill. But, if that is the caſe, the aſſiſtance of two oxen, with the two horſes, will be neceſſary, and conſequently two boys for driving will be requiſite; and theſe may likewiſe, perhaps, be neceſſary for herding the cattle on the paſture grounds, if the incloſures are not in full repair.

If theſe ſchemes are thought worthy of approbation and trial, or even of amendment, ſo as to contribute any thing to the improvement of our preſent defective ſtate of agriculture, I ſhall gain my end, in having the ſatisfaction of doing ſome ſervice beyond the bounds of my own farm. I am, &c.

Clackmannan ſhire,
June 26th, 1773.

THE SCOTS FARMER,

JULY 1773.

ARTICLE LXV.

Of the Harrows, and Harrowing—Of the Roller, and Rolling—Of the Wheel-carriages uſed by the Farmer.

[Dickſon's Agriculture, Vol. I.]

Of Harrows.

THE harrow is the inſtrument by which the ſurface is made ſmooth after plowing. One horſe is ſufficient to draw the one commonly uſed. Sometimes three of them go abreaſt, and ſometimes only two. When the ſurface is very rough, two are reckoned ſufficient for the attention of one perſon; but when three can be uſed, they make better work, and are nearly equal to two pair.

There are ſeveral different kinds of harrows uſed in Scotland. The kind that is moſt common needs not to be deſcribed, as it is ſo well known, and as there is no great art required in making it.

When the land is rough, the harrows are apt to ſtart, and get a-top of each other. To prevent this, ſome perſons fix pieces of crooked timber to the outſide bulls, that are contiguous to each other, which ſtretching a little over, thereby prevent the harrows from ſtarting up, and keep them in their proper place. Others couple the harrows together in ſuch a manner, as to allow them to go before, and fall back of each other, and at the ſame time turn upon a hinge. This way in ſome reſpects has the advantage of the other; for the harrows are kept cloſe together, and they keep each other by their mutual weight from ſtarting over the clods. But then it has this

diſadvantage: if the driver is not very attentive, one of the horſes will get both harrows to draw.

When ſtiff land is plowed wet, it is raiſed in large pieces; and theſe pieces, when dry, become ſo hard, that the common harrows make no impreſſion upon them. To reduce this kind of land, a large harrow called a *break*, has been contrived. There are different kinds of this harrow. One kind is of the ſame ſhape with the common harrow; another kind is of a triangular form. This one is drawn by the corner, and has teeth fixed both in the ſides and behind. Both kinds are made heavier or lighter according to the kind of ſoil for which they are intended. Some of them are made ſo heavy as to require ſix or eight cattle to pull them. It is very improper to uſe the heavieſt kind of them in land where there are large or faſt ſtones; for in going, their weight will not allow them to ſtart over theſe, as the ſmall harrows do, but being intangled, are torn aſunder by the cattle.

There is another kind of harrow, which, though but little uſed as yet, will be found moſt beneficial in many caſes. It is of the ſame form with the common harrow, only a great deal broader; the bulls are placed at a greater diſtance, and conſequently the teeth thinner placed; the teeth themſelves are very little thicker than the teeth of the common harrow, but much longer, and thoſe in the fore-part ſet in ſuch a manner as to ſlope forward. It is made of ſuch a weight, as to be eaſily drawn by two horſes. It is obvious, from the conſtruction of this harrow, that it will go deeper than the common harrow. The teeth being thinner ſet and longer, and thoſe in the fore-part of the harrow ſloping forwards, naturally make it go deeper. It makes the land opener than the common harrow, covers the ſeed deeper, and is more proper for tearing up roots. It ſeems alſo to be the moſt proper harrow for breaking turf: the common harrow goes over turf without making much impreſſion: the break-harrow tears up the turf in large pieces, and throws it in heaps; but this harrow, by having

having its teeth long, ſharp, and thin placed, will break it in pieces. It is not indeed pretended, that it will be effectual for this purpoſe; but it is certain, that the teeth of this harrow will tear ſome pieces of turf, which the teeth of the common harrow will make but little impreſſion upon, and which the break-harrow will drive along before it. At the ſame time, it muſt be obſerved, that this harrow is not proper for ſtony land, or land where there are large hard clods. For its teeth, being long and ſmall, are eaſily put out of their place.

The laſt kind of harrow that ſhall be mentioned is the French harrow. It is of a triangular form, with a joint near the angle, to which the draught is fixed. It has two handles, by which it is made to go either deep or ſhallow. Its principal uſe is to level ſteep ridges, which it does moſt effectually. It is drawn acroſs the ridges; when at the crowns, by preſſing on the handles, the harrow goes down, and carries earth along with it to the furrows. When at the furrows, by lifting up the handles, the harrow is brought out of the ground, and the earth left behind. But this is a very improper work, unleſs where the land is very dry ſituated, and in no danger of being damaged by water. The plough can reduce high ridges as quickly as is convenient.

Of Harrowing.

The chief deſign of harrowing is to ſmooth the ſurface. By this weeds are deſtroyed, and ſeed, if ſown, is covered.

Root-weeds, that are looſed by the plough, are ſometimes torn up by the harrow, and thus are deſtroyed. When this is the deſign of harrowing, the harrows ſhould go acroſs the ridges, or rather acroſs the way that the plough has gone. Becauſe, by going acroſs the earths of the furrows, the teeth of the harrow are apter to catch hold of the roots, than if it ſhould go in the ſame way with the plough.

Though the harrow may bring ſome part of the roots above ground, yet commonly ſome other parts continue below, which

which will grow if undiſturbed. This makes it neceſſary for perſons to follow the harrows, and gather all the roots which they obſerve brought up, and carry them off the field, or burn them.

If harrowing does not actually tear up the roots, it encourages their vegetation, by filling up the hollows, and thereby defending them againſt their greateſt enemy, the drought. On this account harrowing is improper for deſtroying root-weeds, excepting after a ſpring-plowing, when the land is ſoon to be plowed again for ſeed. For at this ſeaſon the drought is ſeldom violent, and it has not time to operate in the deſtruction of the roots; and therefore whatever the harrows bring out is ſo much deſtroyed.

The ſame things that make harrowing improper for deſtroying root-weeds, make it very proper for deſtroying ſeed-weeds. The ſmoother that the ſurface is made, and the more effectually that the mold is broke, the ſeeds near the ſurface are the more expoſed to the air; and the ſap, which is in the land, the more effectually retained. Both theſe are neceſſary to promote the vegetation of the ſeeds, and they muſt vegetate before they can be deſtroyed; but harrowing not only promotes the vegetation of the ſeeds of weeds, but alſo deſtroys the young plants when ſprung up; ſo that one plowing, if the ſeaſon is favourable and ſoil allows, may be attended with ſeveral harrowings, and thereby ſeveral crops of weeds deſtroyed.

If land riſes in hard clods, the harrow makes but little impreſſion; at leaſt before the clods are broken, the land is made ſo firm by the treading of the horſes, and the weight of the harrows, as to render the work uſeleſs, and ſometimes deſtructive. Great care ſhould therefore be taken to prevent land from being brought to this ſituation. If land once riſe in hard clods, it is vain to expect to break them with the harrow, ſo as to cover the ſeed. Unleſs the ſeaſon is very wet, it will remain in this ſituation through the ſummer, and afford

ford but little nouriſhment for the crop. Sometimes it will remain in this ſituation after men have attempted to break the clods with malls.

If the ſoil is light and ſpungy, it can ſcarcely get too much harrowing; for the more that it is harrowed, it becomes the firmer. But if the ſoil is ſtiff, the leſs harrowing it gets the better, if the purpoſes propoſed are anſwered. The effects of harrowing are in this caſe contrary, to thoſe of plowing: Plowing renders ſtiff ſoil more free and open, but harrowing renders it ſtill more firm and ſolid.

The ordinary way of harrowing after ſeed is ſown, is firſt along the ridges, then acroſs, and then along again. If ridges are flat, they may be harrowed either along or acroſs; and the work may be begun or ended either way. But if the ridges are ſteep, it is improper to begin by harrowing acroſs, becauſe thereby too much of the ſeed will be drawn into the furrows. If the ridges are very ſteep, for the ſame reaſon, it is improper to harrow acroſs at all. For another reaſon it is thought improper to harrow acroſs ridges, when the land has been plowed immediately out of lea or graſs. In plowing this kind of land, the ſward is for the moſt part turned over whole; ſo that when the harrow goes acroſs, inſtead of tearing the ſward, it is apt to turn it back into the furrow from whence it was taken. When ridges are gathered or caſt, this will probably happen. In caſting, the earths of the furrows on one ſide of the ridge are turned towards the crown; and, in gathering, the earths of the furrows on both ſides are turned the ſame way; and therefore the harrows, when drawn from the crown to the furrow, are apt to take hold of the unbroken ſward, and turn it back. But this does not ſo readily happen when the ridge is cloven: becauſe in cleaving, the earths of the furrows on both ſides of the ridge being turned from the crown, the harrows, in going up from the furrow, are not in ſuch a danger of turning them back. In plowing lea, the earths of the furrows are ſometimes placed as exactly as poſſible upon their edge

edge, that ſo they may be the more eaſily torn by the harrows. When theſe are turned to the crown, they do not ſupport each other, and are therefore eaſily turned back by the harrow, in going from the crowns to the furrows: but when the earths are turned to the furrows, they ſupport each other by their weight; and therefore are not ſo eaſily turned back by the harrows in going up from the furrows to the crowns.

Of the Roller.

The roller is an inſtrument alſo uſed in tillage. Like the harrow it ſmooths the ſurface. There are ſeveral kinds of rollers. One kind is made of ſtone; another of a log of wood; another of caſt iron: but the one that is moſt common, and moſt eaſily procured, is made by nailing narrow boards upon three wheels, one in the middle, and the other two at the ends of the roller. The only eſſential difference in rollers is in their weight. As in ſome caſes a heavier, and in others a lighter one is needed, the roller is generally made in ſuch a manner, that weight can be eaſily added to it, or taken from it.

That the draught may be the eaſier, and two or more horſes yoked with leſs inconveniency, the diameter of the roller is made great. But the greater that the diameter is made, the greater weight muſt be added to the roller: for the greater that the diameter is, the greater part of its ſurface reſts upon the ground, and, conſequently, the leſs impreſſion it makes. It is neceſſary, therefore, that the weight of the roller bear a proportion to the greatneſs of the diameter, that ſo the ſame effects may be produced. The turning the kind of roller commonly uſed, is very ſevere upon the cattle: for, in turning, the roller does not move upon its axis, but is dragged along the ſurface. To remove this inconvenience, a kind of roller has been lately contrived, with a diviſion in the middle, as if two rollers were joined together. This kind turns very eaſily: for, in turning, both parts move round their axis; the one moves forward, and the other back.

There

There is a kind of roller, mentioned by the author of the ew ſyſtem of agriculture, for dividing turf into pieces for urning. This roller has hoops around it, at two feet diſ- ance from each other; the hoops with ſharp edges, raiſed bout ſix inches above the ſurface of the roller. This, he ſays, rawn over a field, acroſs the way it is to be plowed, will make he earths of the furrows riſe in pieces of two feet length. It uſt be owned, that this would be a very expeditious way of utting the turf; but it is to be feared, that either the roller uſt be exceſſively heavy, or the land exceſſively ſoft, to make anſwer the purpoſe.

Of Rolling.

Rolling is practiſed with ſucceſs, both on land lying in graſs nd on land in tillage. It is of advantage to land on graſs, y preſſing down mole-hills and mole-runs. Some ſay, that alſo deſtroys fog.

When land is laid down in graſs for hay, rolling is of uſe n ſmoothing the ſurface, and, when laid down in graſs for aſture, it makes the graſs ſtool, (tiller), and grow thicker.

There is a kind of land, which, when clover is ſown upon , throws out the young plants after froſt. Rolling, in the eginning of winter, and immediately after the froſt is gone, is ſaid, will, in ſome meaſure, prevent this. The firſt rol- ng prevents the froſt from penetrating ſo deep, as otherwiſe would do; and the ſecond makes the land firm, after hav- g been looſed by the change from froſt to open weather.

Rolling may alſo be uſed with advantage upon land in til- ge. When the land is naturally ſtiff, and may be reduced y the harrow, rolling is very improper; for it makes this kind land ſtill firmer than the harrow does. But if the land riſes clods, which the harrow does not reduce, rolling is very roper; for it ſmooths the ſurface, and breaks the clods, more ffectually than harrowing.

When

When the land is light and ſpungy, the roller ſhould alway be applied after ſeed is ſown; for it is ſcarcely poſſible to mak this land too firm.

It was obſerved, that, to deſtroy root-weeds, land ſhould b made rough, and raiſed in as large pieces as poſſible; and th it ſhould be allowed to ly for ſome time in that ſituation. Ro ling, after this, is of great uſe; for, without it, if the weath continues dry, it will not be poſſible to make the land fit for re ceiving another plowing.

If the land is ſoft below, and ſome hard clods upon the ſu face, which the harrow does not break, rolling may be uſe with ſome advantage; for, beſides ſmoothing the ſurface, will bruiſe ſome of the clods; and ſuch of them as are preſſe down, will be diſſolved by the natural fermentation of the ſoi if in good heart.

Sometimes in ſtiff land, plowed dry, after a former w plowing, or when, by any accident, it has been much tr upon, the whole riſes in hard clods, which the harrows cann break, ſo as to cover the ſeed. In this caſe, rolling is of gre uſe. It bruiſes ſome of the clods; and, when followed by th break-harrow, theſe clods are raiſed up and broken. Thoug rolling ſhould do no ſervice but ſmooth the ſurface, yet, o that account, it ſhould be practiſed. For when the ſurface ſmooth, the corn may be cut down more expeditiouſly th when it is rough and uneven. When graſs-ſeeds are ſow for hay, it is abſolutely neceſſary to ſmooth the ſurface: th roller is moſt proper for this. Some uſe it before, and ſom after ſowing. When it is uſed before ſowing, the ſeed more equally ſcattered.

Graſs-ſeeds muſt be ſown in ſuch a manner, as to ly ne the ſurface; otherwiſe they will not vegetate. The maki the land firm by rolling is therefore an advantage, as, by the ſap is better preſerved; and this does not ſo much d mage to graſs as to corn, for the ſeveral kinds of it are com monly better forragers.

Of the Wheel-carriages uſed by the Farmer.

Although wheel-carriages are not properly inſtruments uſed in tillage, yet on account of their utility to the farmer, it will not be amiſs to give them a place here.

The cart is uſed by the farmer for carrying out the dung to the fields, carrying in the corn to the ſtack-yard, and carrying the victual to market. It is important, therefore, to know which of the kinds uſed is the moſt beneficial.

The principal difference in wheel-carriages conſiſts in the number, height, and breadth of the wheels, and the number of cattle and manner of yoking them. I do not propoſe, nor indeed do I think myſelf qualified to enter upon a particular diſcuſſion of theſe points: I ſhall content myſelf with making a few obſervations, which may ſerve for hints to others to conſider the ſubject with greater accuracy: and in theſe I ſhall confine myſelf chiefly to the height of the wheels, and the number of cattle yoked.

In comparing high and low wheels with each other, we ſhall ſuppoſe the one five feet diameter, and the other four. In drawing any weight upon high wheels, it is plain, that there is leſs friction to overcome, than in drawing the ſame weight upon low wheels. If the circumference of one wheel is fifteen feet, and of another only twelve; if the diameters of the axles are equal, and equal weight upon them, then no more friction is overcome in the higher wheel when it advances fifteen feet, than in the other when it advances twelve. Hence the common maxim, that in carriages where the diameters of the axles are equal, an equal force applied will draw weight, in proportion to the circumferences of the wheels. But it muſt be obſerved, that this proportion is juſt only when the carriages are upon the plain. For it is certain, that in going up hill, a greater additional force is neceſſary to draw the heavier weight upon the higher wheels, than to draw the ſmaller weight upon the lower wheels. In drawing a

carriage up hill, a force is required not only ſufficient to overcome the friction, but alſo to raiſe the weight. Now to raiſe the greater weight, a greater force is required, and the lower wheels have an equal power to raiſe weight with the higher. For, in proportion as the *radius* of the wheel is ſhorter, ſo the diſtance from the place where the wheel is in contact with the hill to the plumb-line let fall from the centre of the axle, is ſhorter likewiſe.

But the high wheels ſeem to have this advantage likewiſe. An equal force applied has greater influence. The nearer that the line, in which any force applied to a body is directed, approaches to the direction of the plane on which the body moves, the force applied has the greater influence. Now, in a carriage with five feet wheels, the ſhafts are placed more horizontal than in a carriage with four feet wheels, and therefore approaches nearer to the direction of the plane on which the carriage is drawn. But the high wheeled carriage has this advantage, only when the road is ſmooth. In a road that is much broke, where there are hollow places, or other ſevere interruptions, the direction of the draught in the lower wheeled carriages is the moſt proper, and the force applied has greater influence upon it than upon the higher wheeled carriage. In a carriage with five feet wheels, if the ſhaft horſe is of an ordinary ſize, and has the draught fixed to him at the height of four feet four inches, the direction of the draught riſes about one foot in five, or makes an angle of 11° with the plane upon which the carriage is placed. Now, when the road is broken in ſome places, if, in theſe, the aſcent from the bottom is more than one in five, which is frequently the caſe; and if, when drawing the carriage out of theſe, the horſe is upon the plane of the road, which is likewiſe commonly the caſe; then the direction of the draught is too low, which not only leſſens the force, but alſo lays an additional weight upon the wheels, and makes them dip the deeper. But theſe are not all the diſadvantages; for in this ſituation, the horſe is

drawing

drawing, loſes ſo much of his weight, and is in danger of loſing his feet. In this caſe then, the lower wheels have a remarkable advantage. In every difficult ſtep of this kind, that requires a ſevere pull, the carriage is not only eaſier drawn, but the horſe likewiſe is more able for it.

In almoſt every road, there are ſtones over which the wheels muſt paſs, which may be conſidered as perpendicular interruptions. It will not be amiſs to compare the higher and lower wheels in this ſituation. In ſome reſpects the higher have the advantage, and in ſome the lower. The levers of the high wheels have much greater power; and the higher that the ſtones are, the difference betwixt their powers is the greater: but then the lower wheels have the draught in a more proper direction, if the ſtone is more than one inch high, and the horſe has greater power, as leſs is taken from his weight. In the general, it may be obſerved, that in low wheels, the more that the horſe draws, he receives the more weight upon his back; which, beſides making the carriage lighter, if he is not overloaded, makes him more able to draw, as it adds to his weight, and makes his feet firmer.

In deep roads that are plain, the higher wheels have greatly the advantage. As they have a larger baſe, they do not dip ſo deep, and as a ſmaller part of them is below the ſurface, their levers have a much greater power, and therefore can more eaſily overcome the reſiſtance ariſing from the deepneſs of the road.

But if the higher wheels have the advantage in deep roads, the lower wheels have the advantage in going down hill, where the declivity is ſuch, that the weight of the carriage is ſufficient to overcome the friction; for the greater that the friction is, the leſs force is neceſſary to reſiſt the weight. In going up hill, the weight and friction act on the ſame ſide, and therefore the leſs that the friction is, the leſs force is required to overcome them: but in going down hill, the weight and friction act on different ſides; and therefore the leſs that the friction is, the greater force is required to reſiſt the weight.

It

It is perhaps as difficult to determine what number of cattle ſhould be put to a cart, as to determine the height of the wheels.

In Scotland the firſt carts uſed were ſmall carts, drawn by one horſe each. In the plain countries, larger carts were afterwards introduced, with two and three horſes; and wains with two oxen and two horſes. A perſon who has not made exact trials of theſe different carts himſelf, if he would judge from experience, muſt attend to the practice of thoſe who are chiefly employed in carrying heavy goods from one place to another. Now, among theſe, a cart with three horſes, is ſeldom or never to be ſeen; and in ſome places, where moſt of the carts were formerly two horſe carts, one horſe carts are now very frequent, two of them driven by one man. It becomes therefore, a very proper inquiry, Whether two carts with one horſe each, or one cart with two horſes, are moſt beneficial?

Two ſmall carts require more money to purchaſe them than one larger cart: but then, carrying leſs weight, they laſt longer, and need fewer repairs.

The expence of working them is the ſame, for both of them require one driver and two horſes. If there is any difference in this, the advantage is on the ſide of the ſmall carts, as theſe are eaſier loaded and unloaded.

The friction in the larger carts ſeems to be leſs than in the two ſmaller carts. In the larger cart, the two horſes have the friction only of two wheels to overcome; but, in the ſmaller carts, they have the friction of four wheels to overcome: and as the wheels in the ſmaller carts are lower than the wheels in the larger cart, one of them has more friction than one of the other. But the difference of the friction in theſe is perhaps not ſo great as it at firſt appears. As the ſmaller carts have leſs weight to carry, the axle may be made proportionably ſmaller, by which the friction will be leſſened: and it is certain that when the axles are equal, the friction is in proportion

portion to the weight; ſo that the ſmaller carts having ſmaller axles, and leſs weight upon theſe ſmaller axles, it is probable that they may carry a greater weight than one larger cart, and have no more friction.

The greateſt difference betwixt theſe carts conſiſts in this: the force applied to the ſmaller carts is almoſt always properly directed; it is not ſo with the force applied to the larger cart. In the ſmaller carts there is but one force applied, and this can be eaſily directed; but in the larger cart there are two forces applied, and theſe frequently in different directions. Sometimes one of the cattle ceaſes to draw, and thereby obliges the other to draw the whole, by which he is more exhauſted in five minutes, than he would have been, by drawing a proper weight, in five hours.

When theſe things are conſidered, it will not appear very extraordinary, that the perſons employed in carrying heavy goods from one place to another, ſhould uſe carts with one horſe each, inſtead of carts with two horſes. And perhaps the farmer, in ſome caſes, might find it for his advantage to do the ſame.

Broad wheels have lately been introduced; but as they are expenſive, it cannot be expected that they will become general, unleſs the advantages of them appear very obvious. It is certain they do leſs damage to roads, than narrow wheels carrying the ſame weight: but it is certain, likewiſe, that, though the friction is the ſame in them as the others, yet they meet with many more interruptions in going, which render them ſeverer upon the cattle. If uſed by the farmer only upon his fields, they might be made at leſs expence, and would be more advantageous. Their breadth prevents them from dipping ſo deep on ſoft ground as narrow wheels, and on that account are eaſier drawn, and do leſs damage.

This ſubject is important, and the general things here mentioned may ſerve as hints to others, to conſider it more minutely.

ARTI-

ARTICLE LXVI.

A Letter to the Weſt Country Farmers, concerning the Difficulties and Management of a bad Harveſt. Written in the end of the Year 1772.

[Addreſſed to the PRESES and MANAGERS of the KILBARCHAN FARMER SOCIETY.]

GOOD FRIENDS.

OF all laborious employments yours is the moſt uſeful and perhaps, upon the whole, it is the moſt pleaſant and healthful. There are, however, inconveniencies, toils, and hazards attending it, which greatly diminiſh both its comforts and its profits. Theſe chiefly ariſe from your climate and ſeaſons, which in the Weſt-country, are not often very favourable to your operations and hopes. But of all the calamities attending huſbandry, none gives the farmer ſo much trouble as bad harveſt ſeaſons. Theſe produce at times the moſt painful anxiety: they increaſe the labours and expences of the huſbandman. And the more he has improved his fields, and has ſeen upon them the fruits of his ſkill and induſtry, the greater often is his loſs, and the more grievous his diſappointment. Nor does it add a ſmall matter to his grief, that his misfortune happens at the very time when he thought of enjoying the returns of all his labours. The happineſs, the joy of harveſt, which is ſo much celebrated in ancient writings, and has afforded their fineſt alluſions; that joy, which, in happier climates, is ſtill the cauſe of mirth and ſong, you, my friends, ſeldom taſte, in full ſecurity and eaſe. And mixed as it often is, with toilſome days and reſtleſs nights, with many cares and fears, with much loſs and vexation, you can hope for no compenſation for your loſſes, but in your own ingenuity and induſtry; no compaſſion for your ſufferings, but in the mercy of heaven.

Neither

Neither are you, my friends, the only ſufferers, by bad harveſts; the tradeſman, the mechanic, and the common labourer, are all concerned in the quantity and the quality of the grain which you bring to market. Nay, the public may be ſometimes ſaid to ſuffer more from the injuries of a bad harveſt, than even ſome of yourſelves do. For on ſuch occaſions, the advanced price makes up in part the loſs, at leaſt to thoſe of you who hold the largeſt farms. At the ſame time, in the ſmaller farms of the Weſt, your own families often add to the demands upon the public markets, and help to increaſe the price of all the victual brought to them. In a word, I imagine, it will be found on trial, and may be conſiſtent with the remembrance of the oldeſt and moſt experienced farmers, that victual never roſe much above its ordinary price, but from the loſs which the crop ſuſtained in harveſt. Nor was it ever diſguſting to the taſte, or hurtful to the health of man or beaſt, but from the injuries it received in that ſeaſon.

For theſe reaſons, amidſt all the valuable inſtructions upon improvements, which are given by the writers on huſbandry, a few hints on Harveſt-work may not be unprofitable. And that farmers may enjoy the benefit of them, as of all other inſtructions, I would deſire that they would give them a patient hearing and trial.

The writer of this letter does not claim the public attention, from his long experience in farming, nor from the number of obſervations which he may have made upon that buſineſs. His manner of life did not afford him ſufficient leiſure, nor his farm ſufficient opportunities for theſe purpoſes. What, however, he enjoyed of either he did not overlook; nor was he inattentive to things of common benefit, which he could learn from books, or from the obſervations and practice of others. Beſides, as he did not wholly depend upon his farm, nor was altogether indifferent to its advantages, he conſidered himſelf as in a middle ſtate; neither able to throw out expence upon extravagant projects, nor yet unwilling to run

the

the riſk of a promiſing experiment; by which he himſelf, or any of his neighbours, could be inſtructed and convinced of its uſefulneſs. Upon theſe and the like grounds only, he claims at preſent a little of your time and attention.

It has long been a queſtion with me, whether, in reſpect to the difficulties and dangers in harveſt, it be better upon the whole, for the farmer to have his crops early or late in that ſeaſon? I have indeed no doubt of the advantage of early plowing, nor even of early ſowing ſuch grain as takes a long time to ripen. Nothing, I imagine, can be more abſurd, than for our farmers to have their plowing to begin in the month of March, and their ſowing in the month of April, while they ſuffer ſome of the fineſt weather in January or February, to paſs without any field-employment. This neglect often obliges them to plow in all weathers, and either to ſow in a very indifferent ſeaſon, or to delay it till it is ſo late, that the produce is both thin in the grain, and comes by far too late in harveſt. But the earlineſs, or lateneſs of our harveſts does not altogether depend on our ſowing early or late in the ſpring, unleſs the difference be very great between the two. The odds at harveſt is oft as great between a warm and cold ſoil, and between early and late ſeed.

But unto whatever cauſes we aſcribe our earlineſs, or lateneſs in harveſt, the queſtion ſtill returns upon us, Which of the two is ſafeſt in general for the farmer? And having long conſidered it, and made ſeveral trials of both ways, I am ſtill unable to reſolve it to my own ſatisfaction. Having an early ſoil myſelf, I got the earlieſt ſeed, and both plowed and ſowed among the firſt; and for two or three years I triumphed in the earlineſs of my crop; my fields being ſometimes almoſt cleared before my neighbours had begun to reap. And as we are fond of having our good fortune appear to be the effect of reaſon and judgment, I uſed to ſay, that in our northern climate and ſhort ſummers, the very term *late*, whatever it was applied to, had ſomething in it diſagreeable and inconſiſtent, that could never be my choice—That my corns enjoyed a

longer

longer day, a much higher and warmer ſun, which contributed to perfect them more effectually, both before and after they were reaped; of all which the later corns were deprived. But I did not always rejoice in my own earlineſs. In ſome of the worſt harveſts my lateſt neighbours triumphed in their turn. Nor was there wanting on their ſide a ſhew of reaſon, that ſeemed to vindicate their negligence. Our Lambaſs floods, ſaid they, often vie with our equinoctial, or as they call them, our Bulloch ſtorms. Beſides, early ſeed corn is more apt to grow than late ſeed, for in this very readineſs to germinate conſiſts much of its earlineſs: add to all, if the weather is moiſt and rainy, corn of every kind grows ſtill more readily, on account of its being cut early in the ſeaſon, for then it has more of the ſummer's heat to make it ſpring. Theſe arguments ſeem to balance one another pretty nearly, and the latter end of harveſt being as often good weather as the beginning of it, it is impoſſible to ſay, whether an early or late harveſt can be moſt depended on. For my own part, I have been convinced of late, that a greater proportion of late ſeed is preferable upon light ſoils. I have not however given up the practice of ſowing it as early as poſſible, and I would recommend the ſame practice to thoſe eſpecially who have heavy ſoils; at the ſame time that they keep ſome of the earlieſt ſeed for their lateſt ſowings. Beans, for example, may be ſown with advantage, in February or earlier. And if our peaſe are not ſown then, they may be ſown with near as much advantage in the end of April. The ſame treatment may be given to late and early oats. And if the farmer has a proper aſſortment of ſeed, he can both catch the different ſeaſons of ſowing in ſpring time, and have his whole fields more under his command at the time of reaping them; which laſt muſt be of particular advantage in regard to harveſt-work; becauſe if one does not live in the neighbourhood of ſome town or village, from which he can be ſupplied with reapers at pleaſure, it muſt be peculiarly inconvenient for him to have all his fields upon him at once.

I recollect no other management previous to the harveſt labour itſelf, that tends to facilitate the affairs of that ſeaſon, but one; it is this, That we take care to have our crops as clean as poſſible; for no corns ſuffer more from a bad harveſt, than thoſe which are full of graſs and other weeds; none ſucceed better than thoſe which are perfectly free of all mixture. This, amongſt many more important conſiderations, ſhould recommend to us, the practices in uſe with our Engliſh neighbours; I mean thoſe of hand-weeding and hand-hoeing, or rather thoſe of horſe-hoeing and ſummer-fallowing. Some of thoſe practices are uſed for the benefit of the preſent crop, and all of them are profitable for the ſucceeding crops. But though the ſafety of their corns in harveſt may be ſcarce conſidered in ſuch operations, yet do they alſo enjoy this benefit of them, in an important degree, if I am not much miſtaken. One can ſcarce indeed account for their getting in their whole corns, ſo ſoon after reaping them, merely from climate, even though theirs ſhould be better than ours. Such a remarkable difference in this (for they will carry in their wheat on the day after it is reaped, and other corns in proportion) cannot be accounted for, but from a combination of different cauſes; of which their better climate may be one; better methods of preſerving corns after they are got in, may be another; and a third may be that which we have here touched at, the cleanneſs of their crops.

But paſſing theſe previous operations, we proceed to the more immediate deſign of this letter; which is to treat of the dangers, and remedies of bad harveſt ſeaſons. I therefore obſerve, that the dangers in harveſt time ariſe from high winds, and great rains.

Of High Winds.

There ſeems to be no effectual precaution againſt ſhaking, from violent winds; except a ſpecial attention to thoſe fields, which, by their elevated ſituation, or north weſt poſition, ly more

more expoſed to danger. One ſingle obſervation may however be uſeful, to ſuch as can attend to circumſtances, and govern themſelves accordingly. It is, That high winds commonly happen during the ſpring tides, as they are called, that is about three days before, and as many after the full and change. If a field therefore much expoſed, happens to be ripe at the approach of theſe periods, it ſhould, if poſſible, be cut down before they come on. Beſides, as ſuch winds commonly bring rain at laſt, in order to ſave the trouble of again introducing this circumſtance, I here alſo obſerve, That if we have a field ready for ingathering on theſe occaſions, it ought not to be deferred beyond theſe times. Though ſuch obſervations may ſeem but trifling, to ſuch as never thought of their importance, yet I muſt confeſs, I have paid a ſcrupulous regard to them theſe twenty years paſt; and have often cut down a field a day or two before the time, in hopes of eſcaping the winds expected at ſuch periods; and even ſometimes have done it at the diſtance, which I thought ſufficient in favourable weather, to win the corn before the next period of danger ſhould overtake me: and I have frequently ſucceeded in both. If what I apprehended at the full, or more commonly at the change of the moon, did not happen, I did not repent my attention to it; becauſe it might have happened, and have caught me unprepared.

After the huſbandman has ſuffered by a ſhaking wind, his loſs admits of no remedy, nor alleviation from the common practice in Scotland. In England, indeed, their cuſtom is to mow their oats and barley, and to prepare them for the rick or barn, as they do hay,; ſo that by raking them backwards and forwards upon the ſtubble, a good deal of the grain and ears are left upon the ground; a quantity equal perhaps to the loſs ſuſtained by a ſhakewind. But while the love of a freſh meat meal may have at firſt quickened invention, their perpetual waſte by this method of reaping ſecures to them a cuſtomary remedy. They rear a good number of poultry,

particularly

particularly geeſe, if they have waſte grounds for that purpoſe; or they buy in a ſufficient number from the wilds and mooriſh grounds, where they are commonly reared for ſale. Theſe they lay upon their cleared grounds, to gather up what is left upon them. In a few weeks after, they can bring them to market at a good advanced price; or in very good order to their own tables. By this management next to nothing is loſt. The grain left upon the ground brings the farmer as much perhaps, as it could have done, had it been carried into the barn upon the ſtraw. Beſides, ſuch is the taſte of our neighbours ſouthward, that had all of it been ſaved and gathered in, it would have probably gone to the ſame uſe in the court-yard, that it goes to in their cloſſes and open fields.

I have heard of expedients to prevent corns from being ſhaken, ſuch as laying them down flat upon the ground, with croſs ropes drawn over them, from end to end of the ridges. I never ſaw this practiſed, and imagine the effect muſt at beſt be but trifling; and even ſometimes dangerous, ſo far as it could be made effectual. For as great rains commonly ſucceed high winds, I ſhould think a field quite broken down and lying flat, in a very bad ſtate for ſuch an event, and which I would by no means hazard, could I help it. I do indeed remember a ſtorm, about ſixteen or ſeventeen years ago, that came on with wetneſs, and ended without damage to the ſtanding corn, though almoſt the whole high grounds were unreaped. It begun an hour or two before midnight, out of the ſouth, attended with a dreadful rain, which laid every ſtalk flat upon the ground. Betwixt one and two of the morning it turned directly north, as in January 13,—39, and it blew ſo hard and dry till morning, that in gathering a peaſe ſtack, which it had blown down, and ſcattered into the ditches and hollows, we found not a drop of water in them. Many trees were broke over, and tore up by the roots; many ſtacks and barns were blown down; yet in travelling four or five miles, I could not ſee one looſe corn pickle lying on the ground.

ground. Every ear and ſtalk adhered to the earth indeed, being laid ſo flat by the rain, that it did not riſe till gathered up by the reapers. The only loſs here lay in the difficulty of reaping it, and in the dirtineſs both of the ſtraw and corn. Nothing amazed me ſo much as to ſee no corn ſhaken, till I reflected on the circumſtances in the beginning of the ſtorm. For had the hard wind blown firſt, I was of opinion, that the fifth or ſixth part, could not have been preſerved. The ſaving ſeemed to be providential, which we cannot always expect, nor can we imitate the means of it. I obſerve therefore, that our beſt ſecurity againſt high winds, is to gather a ſufficient number of hands, to cut down the field quickly, by day or by night. Our beſt remedy, after the damage is done, is a ſufficient number of poultry to gather up the grain; unleſs we generouſly leave it to the fowls of the air, who have a right to their ſhare, and notwithſtanding our moſt invidious œcconomy,—*Will*, as the poet ſays, *vindicate their grain*. So much for high winds.

Of RAINY WEATHER.

With us, however, the moſt common harveſt calamities ariſe from the wetneſs of our ſeaſons. This makes our corns grow and rot in the fields; and is oft the occaſion of their being hurried into the barn or yard, where they ſuffer as much as they could have done without. Sometimes our wet weather is extreme, both in its degree and continuance. It ſeems to combat, and often conquers every ordinary meaſure of foreſight or precaution, and even diſappoints the utmoſt efforts of ingenuity and activity. Nevertheleſs as, in moſt caſes, it allows ſome ſcope for prudence and dilligence, if the farmer thinks in time; it is highly requiſite that we beſtow a particular attention to this capital branch of our ſubject.

There are three periods of harveſt-work, in all of which a cloſe attention, and ſtrict caution, may be uſeful to the Farmer. I ſhall ſpeak particularly to them all.

The

The firſt is the period of cutting down;

The ſecond is the period of drying and wining;

The third is the period of ingathering, and ſecuring the crop.

In all theſe different periods, directions and hints may be given, upon the proper management, and requiſite care, keeping conſtantly in our eye the dangers of a Weſt-country climate: for there the harveſt weather is frequently alarming; and if we had been all along ſufficiently aware of its dangers, one would imagine they might have produced the moſt ingenious contrivances, and ſecured to us the beſt cuſtoms of any corner in Scotland. But though we are far from being perfect in our methods of huſbandry, there may be ſtill ſomething found among us, in relation to harveſt-work, that is worth imitating. The more favourable weather, upon the eaſtern coaſts, ſeldom calls for extraordinary efforts of ingenuity; nor does it oblige the farmer to ſo ſtrict an adherence to good rules and cuſtoms. Hence, I have heard a very intelligent eaſt country farmer ſay, after he had for ſome time reſided in the weſt, That if he were to educate his ſon to be a complete farmer, he would firſt teach him the Eaſt Lothian methods of culture, and then ſend him to the Weſt, to learn harveſt-work. For he had obſerved, that when a bad harveſt happened in the Eaſt, the farmers there were in hazard of being ruined by it; and that from a too general neglect of thoſe common precautions, which the frequency of danger obliged others to obſerve conſtantly. How far the caſe may be altered of late, I cannot well judge. Farming, for ſome time paſt, is become more an object of thought and ſtudy; and as we in the Weſt have adopted ſome of the Eaſt country methods of improvement, it is likely that they may be paying more attention to the precautions abſolutely neceſſary in the Weſt.

But to come more directly to the ſubject, you will remember, that the firſt period of harveſt-work relates to reaping, and what belongs to that operation.

No

Now, the firſt and moſt obvious rule here is, Never to cut
own corns under rain, nor immediately after it, that they
ay always have time to dry before the reapers are ſet to work.
et ſhearing is commonly the beginning of moſt of the evils
hich accompany a bad harveſt. And therefore this rule may
extended ſo far, as to caution farmers againſt ſetting out
o early in a miſty morning. The avarice of ſome maſters
metimes becomes a ſnare to them. When many ſhearers
beſpoke at a fixed wage for the day, ſuch maſters are de-
ous of having a great day's labour out of them. But it
uld be better for themſelves, to truſt an hour in the morn-
, till they ſaw how the evening might make it up; or to
e the time altogether, than to riſk any thing doubtful in the
ent. If indeed a dewy morning ſeems to uſher in a fine
y, one may venture in ſuch hopes, to uſe the morning with
edom, and be ſufficiently ſafe. The ſame caution may be
tended to corns that have been much lodged, under a con-
ued dropping weather. They ought not to be touched up-
their firſt dry appearance; becauſe their under parts, which
cloſs to the ground, will be found to be very wet, and per-
s growing; for it requires more than one, or even two
s drought, after wetneſs, to make a lodged field fit for
ping. If, however, the field is begun, for want of ſufficient
ntion to its real ſtate, or perhaps for want of other work,
n the wet handfuls, if worth preſerving, ſhould be clapped
n an outſide, inſtead of being thrown carleſly into the very
rt of the ſheaf. But if they feel ſoapie, and have begun
row in the head, it would be better to leave them uncut,
o throw them down in parcels ſeparate from the ſheaf.
y can be gathered afterwards by themſelves, if they are
d of any value. But it is ſcarce to be conceived, of how
e value they often are; and yet that very little ſhall be
ered up with great care, and put into the heart of a ſheaf,
re it never can dry; the farmer will encumber himſelf
it; and it may be, for the ſake of it, or the dampneſs

which

which it occaſions, the ingathering of the whole field ſhall be delayed, and hazarded in the higheſt degree. Is it no better, to loſe at firſt frankly, what muſt be loſt at laſt, notwithſtanding all the labour that can be uſed, and all the ri that muſt be run, in order to ſave it?

Though all good farmers have acknowledged the danger o this practice, and declared openly againſt it, yet corns o all kinds will be cut wet at times. In this caſe, the next ru is, Never to bind them up wet if it can be helped:—I ſa if it can be helped. So precarious is the ſtate of every thin depending upon the weather, that no rule can be made abou it, wholly abſolute, or unconditional. Beſides, the com miſſion of one error generally leads to another. The farme who has cut his corns wet, lies at the mercy of the weathe and is obliged ſometimes alſo to bind them wet; for b long lying on the ground, the ſide next it begins to grow and the ſheaves muſt be ſet on end, to drain off the wetne and give them air. After this happens, they ſhould alway be ſet up ſingle, as ſhall be directed afterwards, till the dry. If in their wet condition they are put up in ſtook o hut, they muſt certainly ſuffer by this management.

From what has been ſaid above, you will eaſily perceiv that when victual has been cut and bound up in a wet con dition, the farmer has put it wholly out of his own powe and ſkill to preſerve or amend it. He muſt entirely depen upon the goodneſs of the weather; and which is more none but the very beſt will ſerve his turn. But this, how ever neceſſary and deſireable, he neither can command, no has he right to expect. On the other hand, if the farme cuts and binds up dry, he hath his corns ſo much in his ow power and management, that he alone is to blame if the ſhould be afterwards loſt: for he can cover them up ſo e fectually, that nothing but the worſt of weather, and of th longeſt continuance, can in any meaſure hurt them. therefore the want of all other labour ſhould force him in

any ſuch bad meaſures, it would be ſafer for him to cut or bind his beans, or peaſe, in a wet condition, than his wheat, oats, or barley. And if ever he tranſgreſſeth farther, it ſhould be with thoſe only of a clean, large, and firm ſtraw. Upon the whole, however, it would be more eligible to avoid, if poſſible, ſuch dangerous practices, with regard to all ſorts of ſtuff, rather than to venture them with any. A wiſe man will rather run the hazard of ſome expence, and loſs of time, than venture a danger which neither ſkill nor pains afterwards may enable him to remedy. In one word, in the worſt harveſts I ever ſaw, the loſs was chiefly in thoſe fields that were cut, bound up, and ſtooked wet. In the beſt harveſts I ever ſaw, the fields which had received that bad treatment at the beginning, have always ſuffered more or leſs in the end, whilſt every thing elſe hath eſcaped ſafe and well.

If then the farmer is conſcious to himſelf, that this error has been committed in any part of a field, though never ſo ſmall a part, inſtead of ſtooking it with the reſt, and ſuffering it to take its common hazard, becauſe the weather comes in fine and promiſing, my advice is to keep his eye upon it, and to take the firſt good day to unbind and expoſe the corn of it to the air, before it hath time to grow, and be irrecoverably loſt. Every labourer knows the difficulty of drying corn in that grown ſtate, and the loſs it muſt ſuſtain by being torn aſunder for that purpoſe. Every one knows how eaſily it may be recovered, when taken early, if the weather be favourable. I once loſt almoſt the whole of a ſet of land, by not knowing till the laſt, that it had been cut and bound wet. The oats were clean and good, as any ever I had. The weather was perfectly fine from the day it was cut, and the ſtooks ſtood all firm and well covered. On the day when it ſhould have been got in, my ſervants examined the field, and pronounced it ready, without exception of any part. They returned too ſoon with their verdict, and I ſuſpected

the examination had been but ſuperficial. I went myſelf, while the horſes were getting ready. I found the ſheaves on that particular ſet of land, to be double the ordinary ſize, for even this advantage had been taken of my abſence; and to crown all, every ſheaf was growing within. To be ſhort, the horſes were countermanded, and the ſheaves were all ſpread out. Two days were ſpent in drying that piece, and after all, the half of the corn was loſt; all of which might have been ſaved, in much leſs time at firſt. What a leſſon was here, to ſuch as could learn from it!

I add but one caution more upon this period of harveſt-work. It is, that the ſheaves be made rather ſmall than large; and at any rate, as near an equal ſize as can be obtained. The farmer ſhould conſider here, for he knows it well, that the ſmalleſt ſheaf is ſooneſt ready: and if there is a great inequality among them, the one half of the field muſt wait for the other, in the beſt weather; and in the worſt weather, runs an unneceſſary hazard, by the delay. I know the difficulty of managing a great number of reapers: but I know alſo what a prudent and peremptory maſter can do, if he ſtands to his point. If he indolently gives it up, he deſerves the loſs. It is better to give ſervants a ſmart word at firſt, than a galling reproach at laſt.

The ſecond period of harveſt-work comprehends the time wherein corns ſtand out in the field for drying and wining.

The management conſiſts in uſing the beſt and moſt approved methods of ſetting them up, and covering them, ſo as both to dry them, and to preſerve them moſt effectually, from the rains and ſtorms, till they are ready for the barn or yard.

Before we ſpeak of ſetting corns out to the drought, we ſhould firſt think of removing them from an inconvenient or dangerous ſituation, to one more convenient and ſafe. 1ſt, All corns upon the level banks of rivers, or on any hollow grounds that

that are naturally wet, or occaſionally ſubject to land-floods and inundations, ſhould be removed as ſoon as they are bound. How abſurd is it to delay this, till the ſtooks are ſtanding in water, or going off with the current? How fooliſh is it on theſe occaſions, to ſee men ſcratching their heads, and bemoaning their loſs, when they ſhould be blaming their own ſtupidity? 2dly, Where there is no ſuch danger from floods, it may be very inconvenient to leave corns for drying under the cover of riſing grounds, woods, or high hedges, where there is no free circulation of air to be of ſervice to them. They ſhould be immediately carried to the opener fields, and higher grounds, where they have every advantage of ſituation. To delay this is at beſt but loſs of time; in a bad harveſt corns muſt ſuffer from their very ſituation, and by a late removal they muſt ſuffer by their carriage. Beſides, the ſtraw itſelf turns ſoft and brittle by long ſtanding; ſo that it cannot again be ſet up aright, nor endure the leaſt wind, without being demoliſhed and blown about by it.

Obſerve, after corns are carried from theſe inconvenient and dangerous ſituations, above-mentioned, into a more open expoſure, the huts, or ſtooks, ſhould never be ſet up too near one another; leaſt by preventing the free paſſage of air among them, we ſhould even hurt the very intention of removing them.

Having premiſed theſe particulars, we return to the buſineſs of our ſecond period of harveſt-work, which is the management of corn, in order to fit it for ingathering. This to us is a moſt important, and ſometimes a very tedious work: for while other parts of the kingdom get in moſt of their corns in three, four, or five days ſtanding, when the weather favours, ours take commonly twelve or fourteen days, with all advantages; and in bad ſeaſons half as many weeks, if not more. The queſtion then is, in what manner they ſhould be ſet out, for the beſt advantage, both of wining and pro-

protecting them? Now, we have three different methods of ſetting out wheat, barley, and oats.

Viz. { Gayting, Stooking, and Hutting.

And though theſe different operations may be generally known, and practiſed through Scotland; yet there are better and worſe methods of performing each of them. I ſhall therefore give a ſhort account of each, for the ſake of a few rules and cautions that may be annexed.

I. Of GAYTING CORNS.

This is performed by ſetting up a ſingle ſheaf ſeparately. If the ſheaf is bound too near the bottom for the purpoſe, the farmer firſt of all draws up the ſtrap a little towards the crop end; then ſetting the whole down upon the ground, with ſome force, in order to beat in the inequalities of its bottom, he ſpreads this out with one hand in a circular form: and, as he leaves a little vacancy in the middle of the circle, he admits the air into it by a ſmall opening towards the wind ſide. Laſt of all, collecting together the looſe heads, and twiſting them about the top, he leaves it to its chance.

The uſe of gayting is chiefly for preſerving wet and green corns, that need immediate drying; and in their wet condition, cannot ſo properly be put together in ſtooks or huts. The coarſer the ſtraw and larger the ſheaf, the more is it fit for ſtanding ſingle, and the more does it require gayting. The operation ſeems to be ſimple; yet errors are often committed in performing it. The firſt that occurs, is an attempt to widen too much the circle of the bottom on which it ſtands; and thereby breaking too much of the ſtraw below the ſtrap. The intention here indeed is, to make the ſheaf ſtand better upon an enlarged baſe; and for this purpoſe it is thruſt down ſtrongly. But the effect is the very contrary of

of that intention; for after the ſtraw is entirely broke, it cannot ſtand at all, in any weather. The ſecond error lies, in breaking down the ſtraw all round above the ſtrap, in order to let in to the heart of the ſheaf, the ſun and air from above; but unleſs the field can be carried in immediately, this too defeats its own intention. For a ſpread head preſents to the rain a kind of cup or filler, to take into the heart of the ſheaf all that falls within half a yard, or three quarters diameter. Beſides, whatever is below the cup above formed, hangs over the ſtrap, like the hair of a new combed head, and effectually prevents both ſun and wind from reaching the wetteſt part of all the ſheaf. Every farmer knows this lies in the ſtrap itſelf, and in that part of the ſheaf which is immediately within it, and ſtraitened by its binding. How have I been galled oftimes to ſee theſe errors going on and perſiſted in, from abſolute thoughtleſſneſs? In ſhort, a ſervant ſhall ſcarce paſs through a gayted field, where he has no work at the time, but he will, after repeated admonitions, ſpoil every gayted ſheaf within the reach of his arm. The true figure of a right gayted ſheaf is that of a circular cone, which, while widened at the bottom, ſhould be drawn, as near as poſſible, to a point at the top, to prevent the rains from ever entering it. And the only management of them when fallen down, is to ſet them up again with all the care poſſible. If the wind blows hard, ſo that they cannot ſtand ſingle, then one of them ſhould be ſet to the leeward of another, leaning on it; and if one will not do to ſupport the other, a third, in the ſame poſition, may ſecure the whole, till the ſtorm blows over. The ſtraw never ſhould be broken, either above or below the ſtrap, but when one thinks of getting in the field, and that there ſhall be no further occaſion for ſetting up the ſheaves any more. Gayting, if the work is wiſely managed, is indeed the ſpeedieſt, and moſt effectual way to dry wet, or to deaden green corns. It would however be convenient to put in ſuch as ſoon as they are ready. If this cannot be done, they ſhould be hutted up, and covered from danger in

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the field itſelf. It is true, that large ſheaves are not ſo fit for huts and broken ſtraw, according to the common ſtate of gayte corn, will not ſtand in ſtooks. The corns ſhould, howeve be ſome way protected, when ready; otherwiſe one ſhowe in this condition, will undo a week's attention, and put ther in a worſe ſtate than ever. And if the farmer recolle ch that rain is much more hurtful to old ſhorn corn, than a any former period, he would ſcarce heſitate, in ſecuring wh is now ready, but ſtill in great danger.

Of STOOKING CORNS.

The ſecond method of ſetting out corns, in common uſe, ſtooking. When corns are cut and bound up dry, ſtookin though not the quickeſt way of wining, is yet the beſt way t preſerve them in dangerous weather, till they are quite rea for ingathering. Good methods muſt however be uſed putting up the ſtooks, and great care uſed in keeping the up; otherwiſe every puff of wind overturns them, and diſa points the intended ſecurity: whereas, if rules are ſtrictly o ſerved at firſt, and proper care taken afterwards, it is hard poſſible for the Farmer to ſuffer any material loſs, even in long courſe of bad weather.

A ſtook, in the weſt country faſhion, conſiſteth either ten ſheaves, eight of which are ſet upon the ground, and m be called ſtandards, two are ſerved for their covering, and a called hoodings; or it may conſiſt of thirteen ſheaves, t of which are ſet upon the ground, and three are reſerved hoodings. The deſign of the odd ſheaf here, is, that wh ſet in the middle, as a rider, it may ſupport the heads of t end hoodings; which in ſo long a ſtook would, without it, f down too much towards the level, before they reached one a other, ſo as to give and to receive mutual ſupport from ea other. Thus the hoodings might be in danger of growi like any other ſheaf that lies long on the level ground: for

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ſheaves ſuffer in wet weather, from their level poſition, or their approaching too near it; whereas the wetneſs drains off the more quickly, the more they are raiſed in their tops. In the ten ſheaves-ſtooks the middle rider is ſcarce neceſſary; becauſe the end hoodings, if choſen large enough, meet more readily for the ſupport of each other, before they incline too much to the level. After all, when a ten ſheaves-ſtook hath long ſtood under a weight of rain, the hoodings begin to ſink their heads, and grow faſt. This invites the crows and pigeons, to ſit down in great numbers upon them, which preſs them down ſtill lower: and while they conſume the grain, they alſo promote the growth of what they leave. In theſe events I have often wiſhed for, and have ſometimes put in a middle rider between the hoodings; that by raiſing their heads a little, the rain might drain better downward, and the fowls might not have ſuch ſure footing, nor ſo much room to ſtand on. I likewiſe thought, that if my ridder had been put in ſoon enough, the growing of the hooding, and the temptation to appetite, ariſing from a tendency towards it, might have both been prevented: for crows, *&c.* are fond of corn when ſwelled, and ready to burſt its cheſt; and perhaps more for the ſweet taſte it may acquire by growing. And on the other hand, they ſcarce touch it, either in ſpring or autumn, till it begins to approach towards that ſtate. What I have ſaid above chiefly reſpects Poliſh oats; which (whether from the ſhortneſs of their ſtraw or the weight of their head) I have always found moſt ready to ſink down to a level as hoodings; and which alſo (whether from their natural taſte, or aptneſs to grow) I have found moſt inviting to the birds.

As I prefer the ten ſheaves-ſtooks, becauſe the eaſieſt tryed and win, I ſhall here give my thoughts upon the beſt and ſureſt method of putting them up. Suppoſe then two men employed, becauſe they are ſometimes neceſſary in windy weather, each of them takes a ſheaf in every hand, and if the ground is level, he chooſes them as near of

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a ſize as poſſible, without loſing time; if the ground de-
clines to any ſide, the talleſt and heavieſt goes to the lowe
ſide. Then the labourers turning their faces to each other,
every man ſets down his pair together. This is done, b
giving their bottoms a ſufficient knock upon the ground
in order to beat in their inequalities, that they may ſtan
ſolid. At the ſame time, inclining their heads toward
each other, care is taken, that they be placed exactly oppoſit
to, and bear equally upon, one another. This being done b
both labourers, each of them again takes up another pair
which he chooſes and ſets by his firſt pair, with the ſame car
and exactneſs. The reaſons for this accuracy are obvious, fo
if all the ſeveral pairs are not equally ballanced, the heavie
muſt in time puſh over the lighteſt. If they are not ſet exac
tly oppoſite to each other, they ſoon looſe their hold of on
another; and ſliding down they lie acroſs the ſtook, and ſo ſe
out their heads on both ſides of it, like the points of a S
Andrew's croſs. Laſtly, If they are not ſet firm upon thei
bottoms, by a knock upon the ground, they ſtand only upon
few pens of their ſtraw that jut out beyond the reſt, and b
their ſlight hold of the earth, they loſe their ballance, and ar
either blown down, or twiſted out of their place, by every pu
of wind. One may think lightly of theſe hints, as niceties o
no conſequence; but if he were paſſing through a field negli
gently ſtooked, but ten days after it was ſet up, he would ſoo
perceive the effects of carleſsneſs, in the diſtorted appearanc
of every ſtook. And if he had any concern in the field, h
would ſoon feel the effects of ſuch general diſlocation: fo
every ſhower that fell, and every wind that blew, would hu
him greatly. Whereas, on the other hand, a field well put u
at firſt, if it is not afterwards diſordered by ſtorm, will, at ſom
weeks diſtance, ſtand firm and upright to the eye; and b
able both to reſiſt a hard gale, and to defend an ordinary rai
incomparably beyond the other.

When the eight ſtandard ſheaves of a ſtook are ſet properl

an open paſſage is left between the two ſides, ſo wide that a little dog could eaſily paſs through, from end to end of the whole. Further, though every ſheaf of the pair leans upon its fellow on the oppoſite ſide, yet ought not the end pair to lean upon the pair next them, ſo as to have their tops too cloſe upon one another; that even here ſufficient room may be left about the ſtraps, for the wind to paſs freely between pair and pair, when it blows acroſs the ſtook. Laſtly, When the ſtandard ſheaves are ſet up, care ſhould be taken to turn the corn knot of them all inwards, that it may be ſheltered from the weather. For it ſhall be ſhewn afterwards, that this is the firſt part of the ſheaf which begins to grow, when it is expoſed to wet weather.

Theſe are the rules and cautions that ſhould be obſerved in ſetting up the ſtandard ſheaves of a corn ſtook. After a little attention to the practice, it is performed with perfect eaſe and readineſs, by any labourer of common ſenſe. When this part of the work is done, the labourers proceed next to the hooding of the ſtook. For this purpoſe each man takes hold of the largeſt, greeneſt, or wetteſt ſheaf at hand, and prepares it for laying on, as a covering to the whole. But this being one of the moſt important operations for the harveſt ſecurity, a few rules and cautions become neceſſary here alſo.

The firſt caution is, to hood always with the crop end of the hooding uppermoſt. By this poſition, the rain that falls drains from the corn head downwards to the bottom of the hood ſheaf. Likewiſe, the corn being elevated above the whole ſtook, is expoſed to the free paſſage of the air, and to the full influence of the ſun for drying it. I have been told, that it is common in the Eaſt, either not to hood at all, which in very bad ſeaſons is dangerous to the whole, or to hood with the bottoms uppermoſt: by this means the corn hanging down claps cloſs round the lower parts of the ſtandard ſheaves. But this alſo is greatly hurtful. For by ſuch a poſition, the corn of the hooding, inſtead of having the wetneſs

drained from it, as above-mentioned, has it all drained to it; ſo that, by a conſtant ſeeping from above, it is kept long wet, even after the rain is over. Nay, there the wetneſs muſt abide; for the corn being wrapt about the bottom of the ſtook, lies ſo cloſs to it, that it can leave no paſſage through itſelf for the tranſmiſſion of the ſun beams, nor the free circulation of the air or wind. Still more, though the outſide of the corn ſhould be hazzured by the ſun or wind, the inſide muſt ever be damp, from its nearneſs to the ground, and cloſeneſs to the damp bottoms of the ſtandards.

I did not here depend wholly upon reaſoning; it might be fallacious. For my own ſatisfaction, I have made repeated trials, year after year, and according to cuſtom in the neighbouring rows of the ſame field. I can therefore aſſure the farmer, from undoubted experience, that the Eaſt-country practice of putting up the bottoms, and keeping down the corn of their hoodings, is moſt pernicious. For, in theſe rows, I have ſeldom loſt in wet ſeaſons, leſs than triple the quantity of what I loſt by our own method. All my reaſonings therefore, on this ſubject, proceeded upon the ſuppoſition that the Weſt-country practice was uſed. An exception ſhould be made of wheat, which preſents a cup to the rain.

Our ſecond caution in putting on our hoodings is, to open the ſheaf under the corn knot, in order to lay it on with that ſide lowermoſt. The deſign of this is to preſerve the corn knot from rain, under the cover and protection of the whole ſheaf. For, as was already obſerved, that knot, retaining the rain, begins firſt to grow. It is no doubt eaſier to open the hood ſheaf under the binder's knot, becauſe at that place it was juſt now put together. Here therefore lies the temptation to lazineſs. But beſides the lazineſs often imputed to ſervants, the ignorance and inattention of the farmer himſelf may be juſtly blamed, if he either does this himſelf, or ſuffers it to be done by any ſervant. I remember that, twenty years ago, after long wet and hazy weather, I croſſed a field both

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put up and hooded in this erroneous way; and perceiving its bad effects, I called out the farmer who was otherwiſe an active and ingenious man. I took notice to him, that all his hoodings were green at the corn knot, and beginning to chip throughout the whole. I here reaſoned with him, for he could hearken to it——That a hard knot did not part with rain, like the ſtraight corn ſet up on one end. On this account, if the corn knot gets rain it begins firſt of all to grow. After which it almoſt never parteth with the wetneſs, till it be torn aſunder, and every ſtraw and pickle of it expoſed to the drought. I obſerved further, that when the corn knot is in this wet and growing ſtate, the moiſture of it will naturally communicate with, and infect the neighbouring parts of the ſheaf; eſpecially about the binding, where he could not but obſerve, that the grain was already begun to ſwell and chip; and had even ſtraitened the ſheaf to that degree, that no moiſture could paſs ſo as to drain downwards, which in a little would entirely deſtroy it. I likewiſe deſired him to examine the ſtandard ſheaves ſo ſet, and compare them with their neighbours, that had the corn knot concealed from the weather. He ſaw, and was fully convinced of his error, and never, I dare ſay, needed another leſſon on the point. In the mean time he loſt for that year near a third part of a ten acres field: by far too great a price for any piece of inſtruction, which he might have purchaſed much cheaper, with a little obſervation of his own, or a little attention to the conduct of his more experienced neighbours. That which aggravated his affliction was, that he was clever, and even knew himſelf to be ſo. What then can be expected of many, who may be ſaid, like the idols of the nations, to have eyes but ſee not, ears but hear not, neither will they underſtand.

The prudent farmer, having ſtooked his field with all the care and exactneſs above recommended, looks back upon it with ſatisfaction and ſecurity; for it ſtands fair and upright to his eye: and conſcious of his care and pains about it, he perhaps

perhaps thinks his labour over with regard to it, for that year. Indeed ſo it is, if the weather continues mild; yet, after his ſtooks have ſtood ten or twelve days in good weather, the ſheaves begin to dry, and turn lighter; and though, if the weather continues, he hopes in a day or two to gather it in ſafely; yet let him not be too ſecure: the wind perhaps riſes from the ſouth, or ſouth-weſt, and begins to blow off his hoodings; then gradually increaſing, it tumbles down and ſcatters all his ſtooks over the field. He ſtands aghaſt and terrified. But, while he is a dreaming what he ſhould do, a flood of rain comes on, and contines, till there is ſcarce a ſheaf in the field which is not thoroughly drenched. Here his whole labour is undone in an hour; hope deferred makes his heart ſick; danger increaſed leads him to deſpondence. This ſurely is a miſerable ſtate to the poor farmer. Let us ſee however, if there is no proviſion for, no precaution againſt, ſo deſolating a ſtroke. I imagine there is, and ſhall mention two ſecurities, which long uſe has recommended to myſelf.

The firſt lies in a certain method of putting on the hood ſheaves. And this may be conſidered as a third caution in hooding. It is performed thus, After the hood ſheaf, ſplit as above directed, is laid on, and in the common faſhion ſpread about the end of the ſtook, the workman ſtanding at that end, graſps in each hand a parcel of the lappets of the hooding, which hang down on each ſide, and thruſts both his hands, thus filled, round the firſt pair of ſtandards next himſelf; this pair and hooding he draws gently towards his boſom, till he gets room, between it and the ſecond pair, to croſs the handfuls over each other. This done, he lets go his hold of them, and with both his hands preſſes the whole (pair and hooding) gently back to their former poſition, till they take hold of the croſſed handfuls, that are now held between the firſt and ſecond pair of ſtandards. The whole of this operation is done in an inſtant, as ſoon as the hoodings are put on; and by the ſame hand that put them on, and alſo before he moves from his

his place. But leaſt the croſſed handfuls ſhould lead in the wetneſs, which falls upon the hood ſheaf, towards the heart of the ſtook, where they themſelves terminate, a few looſe ſtraws, from the ſame lappets, may be ſpread over their place of entering, in order to carry the droppings down the outſide of the ſtook. So that, after the whole is finiſhed, the entry of the croſs handfuls is both covered from the weather, and even from the eye itſelf, as one paſſes along.

This operation I ſurely learnt of ſome body, and I ſoon convinced myſelf of its effects by a fair trial. I have had however difficulties in perſuading my ſervants to comply with it. And as I am fond of governing dependents, rather by their own underſtanding and conviction, than by the mere authority of a maſter, I have had many occaſions of repeating the ſame trials, to ſatisfy their minds. And as a hint to other maſters, my method was this, I allowed my ſervants to put up one row of ſtooks in any field, after their faſhion; I took the next row upon myſelf, which I executed with the precaution above deſcribed; and having made ſmall wagers between us, upon the event, both of us exerted ourſelves to the utmoſt. I need not tell the iſſue of the trials. The wager indeed never was exacted, it being chiefly deſigned as a ſpur and memorial, that was commonly paid by the winner. In the laſt inſtance, I remember particularly, the trial came out like ten to one, there being fifty hoodings down on their row, when mine had left but five. The reaſon is indeed obvious. When the ſtook has had time to ſit together, which it muſt have had, before the hoodings became ſo light, as to be eaſily blown off, the hold taken of them is ſo good, that they can only be raiſed from their ſeats by a wind that will tear up the whole end of the ſtook in which they are faſtened. And if after they were faſtened below, their crops alſo were ſomewhat united, and tangled with each other above, they would there likewiſe take ſuch hold through time, that they could only be torn from their ſeats, by ſuch a tempeſt as was able to overturn at once the whole ſtook from the bottom. And give me leave to obſerve,

ſerve, that this ſcarce ever happens, for the ſheaves are com
monly blown off, one by one, or pair by pair. If it happen
otherwiſe, it can only be in ſuch ſtooks as are leaning half o
ver already; or ſuch as are much diſtorted from thoſe errone
ous methods of ſtooking, which have been already men
tioned.

In caſe the foregoing ſecurity ſhould have been neglected
or ſhould actually fail from the abſolute violence of the wind
there is yet another method of preventing the effects of ſuch
ſtorms, as are deſcribed above, if one could catch the time
rightly. This too I have practiſed ſucceſsfully, and can give
the hiſtory of one inſtance from my laſt year's operations. I
take the fact from thence, becauſe it is recent, and becauſe it
may be remembered by a hundred people, that were occaſion
ally witneſſes of the whole tranſaction.

In harveſt 1771, I had a ſmall field of between two and three
acres, cut and bound dry; ſo that it came to be ſtooked in
good order; but on account of my abſence, the precaution of
faſtening the hoodings as above, had been neglected. About
a fortnight after, upon a Saturday morning, when the field
was near ready for the ſtack, it blew a hard gale from the
ſouth. My harveſt people were of opinion, that if the wind
continued without rain, in a little time it could be taken in
in good order. However fond I was of catching the occa
ſion, yet the ſouth wind being doubtful, and a blackneſs be
ginning to appear, I ordered them to the barn, which was in
ſight of the field, that they might not be engaged in an
work, which they could not leave at a minute's warning; and
I bade them look out, now and then, to the field and wea
ther. At ten o'clock the wind and blackneſs were increaſed
and danger was to be feared about noon. Then I told the
ſervants, that I had given up thoughts of getting in the corn
on that day; but was reſolved if poſſible to keep on the hood
ings, and to ſecure every thing againſt Monday, if the wea
ther then ſhould favour us. I aſſured them, that the rain
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would be on before one of the clock, againſt which time I was afraid the field would be in bad order to receive it, unleſs they exerted themſelves ſtrenuouſly. They either not foreſeeing the danger, or unwilling to leave the cover of the barn, in the approach of a viſible tempeſt, did not ſeem to enter frankly into my views; rather attempting to frame difficulties. After ſome reaſoning, I was obliged to tell them, in a ſtronger ſtile, (I remember the words) That the Devil, the prince of the power of the air, was juſt going to throw down the whole field; and then, like a dog as he was, to lift his leg and piſs upon it; but I was reſolved to diſappoint him, through the help of heaven, and their aſſiſtance. This language ſtruck; and Will ſmiled at the thoughts of a battle, and promiſed to give me notice of the firſt hooding that fell. I retired a little. At eleven the wind preſſing moſt vehemently, I run out again; and finding one of the lads at the corner of the barn, looking at the field; we both together ſaw the firſt hooding fall. In five minutes we reached the field; but by that time, fifty or ſixty ſtooks were uncovered, and ſome down altogether. We began however reſolutely, three hands to the row of ſtooks, becauſe four ſheaves were to be ſet up together, and in ſome violent blaſts they were to be held up, till four more were added. Then, and not till then, I found that the above-mentioned precaution, of fixing the hoodings properly, had been neglected. I now ſaw the reaſon of the total overthrow of the corn, and expreſly ordered every hooding to be fixed on with care. I followed after the ſervants myſelf, picking up, and replacing firmly every ſheaf that fell behind them. By the time we were half, or little more than half through the field, the ſervants deſpaired of the work, and would have given it up. Many hoodings had fallen behind them, all was flat before them, and the rain began to ſpit through the wind, now become a tempeſt. Secure myſelf of the effect, ſo far as we could go, and not yet without hopes of finiſhing the whole, I urged their perſeve-

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rence with good humour, upon the old topic, of reſiſting the devil. They ſmiled and went on vigorouſly; I ſtill brought up the rear. In a word, the whole was finiſhed about five or ſix minutes after the rain came on. We then left the field under a heavy rain, but perfectly well covered and ſecured; for though we often turned to look at it, we had no occaſion to return to it; not a ſheaf being down when we entered the barn, nor at any time after when we ſurveyed it, till it was taken down for carriage. Which is ſtill more, not a ſheaf was hurt by what fell upon it, either before, or after it was put up. The clear proof of our ſucceſs was, that we had the whole field in a ſtack upon Monday, whilſt ſcarce a cart or waggon in the pariſh, was yoked for ſeveral days thereafter, nor could have been in a fortnight, unleſs the weather had been very good that week.

I have narrated this hiſtory minutely, for the ſake of the many things that may be learned from it. For, *1ſt*, It ſhews the good effects of faſtening on the hoodings rightly, and the bad effects of careleſſneſs in this point. *2dly*, It ſhews the importance of a ſtrict attention to the weather, and a foreſight of the dangers ariſing from the ſudden changes of it. *3dly*, It ſhews how much a ſudden ſtorm, and the appearances of danger and difficulty from it, will rather ſtartle and confound the farmer, than rouſe him to proper thought, and a vigorous exertion. And what is ſtill of more importance, *4thly*, This hiſtory ſhews what a bold attempt, and reſolute perſeverence will ſometimes do, beyond all firſt conception or belief. The ſervants, who on Saturday would not enter into the hurry going then on, againſt Monday's evening boasted their ſucceſs; and upon Tueſday were triumphing over their neighbours, who had ſcarce as yet been able to touch a ſheaf. The people on the high way, and the villagers, who overlooking the field, thought us mad, and came out of the back doors to ſee our diſtraction, as they called it, were equa-

ly amazed to ſee the waggon on the field upon Monday morning; and till the corn was almoſt wholly carried off it, could ſcarce comprehend the meaning of our Saturday's hurry.

I doubt not, but there may be many farmers through the country, who can tell ſimilar inſtances of their vigilance, equally ſurprizing in their ſucceſs and efficacy, with what is narrated above. Were ſuch tranſactions faithfully recorded, and minutely attended to, they could not fail of making impreſſions, where dry precept and argument might be forgotten. For which reaſon, I have often wiſhed, that ſome of your occaſional meetings were employed in hearing any well atteſted accounts of ſuch tranſactions; and that ſome ſmall part of your charity funds were allotted, as encouragements, to ſuch as had exerted their ingenuity, prudence, and activity ſucceſſfully, in their affairs of huſbandry. This might have a tendency to ſtir up others, to employ their thought and reflection upon their buſineſs; in the courſe of which, the difficulties and dangers of their way of life might occur to them, and the proper remedies be ſought out, and at hand as it were. Thus difficulties might be encountered with firmneſs and ſucceſs: And is not this better, than for a man to be ſtanding with folded arms, and a vacant face, gazing at them, and dreaming about them, till he is overwhelmed with them?

[*To be continued.*]

ARTICLE LXVII

Of providing Shelter for Sheep by Plantations, and Hay for Winter-Fodder.

[In a Letter to the Publiſher.]

IN my former correſpondence with you [p. 190. 238. 331.] having made ſome obſervations on the moſt common diſeaſes of ſheep, I ſhall now proceed to point out ſome of the greateſt defects and errors that prevail in the management of

them. The firſt defect then is, the want of proper cover and ſhelter for them from the inclemency of the weather. As our climate is cold and rigorous, this ought to be one great object of our attention. Few creatures can bear more cold than ſheep; yet it is evident, that they thrive much better in a mild than in a cold ſeaſon. To defend them then from froſts and ſnows, there ſhould be two or three, or at the leaſt one plantation, in every conſiderable ſheep farm. It is a matter of great conſequence to fix on proper ſpots, otherways the deſign will be fruſtrated. Another thing which muſt be conſidered is, that no fence, except a good high ſtone wall, is ſufficient to prevent ſheep from deſtroying the young plants. Dikes raiſed of earth ſoon moulder down; and at laſt coſt more in repairs than a ſufficient wall at firſt. Beſides, it is ten to one, if, notwithſtanding all the vigilance of the ſheepherd, the ſheep do not climb over, and, in one night, ruin the labour of many years. As the lands generally are now high-rented, it is unreaſonable to expect, that this uſeful plan ſhall take place, unleſs proper encouragement be given to it by the proprietors. Some gentlemen of generoſity and ſpirit would do their country a ſignal ſervice, by ſetting before it a great example. Others have hurt this ſcheme, by injudiciouſly planting firs in a ſoil not natural to them. Such examples indeed are rare.

In managing ſheep, the ſecond glaring defect is, not preparing hay for that ſeaſon when the hills and plains are buried in ſnow. To this many objections are raiſed: We are told, that they would not eat it; that a ſufficient quantity cannot be raiſed; and that they have not hands to make it. To which, and ſuch like objections, it may be anſwered, that lazineſs and prejudice have greatly injured this kingdom in all ages. To this moment we have not triumphed over either of them; but prejudice in particular, that bane of knowledge, that encourager of ſuperſtition, that enemy of learning, and foe to all improvements, ſtill lords it over us. This we have

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reaſon to lament. Let us now conſider the validity of theſe objections. The firſt is ridiculous; for hunger tames the wildeſt animals, and makes the moſt delicate very little nice about the choice of food. Horſes and cows are naturally as wild as ſheep; yet hunger ſoon makes them take to hay. In the low countries of Scotland, ſheep eat hay very well, becauſe they are accuſtomed to it. All that is neceſſary then is, to feed one or two with hay in the beginning of winter, and in a ſtorm to tie them to a ſtake beſide the flock, which will ſoon be led to eat from imitation and hunger. The other objection, that a ſufficient quantity of hay cannot be raiſed, is more juſt and ſolid. It is however ſtrange doctrine to ſay, that becauſe a man can not gain ſeveral thouſand pounds, he ſhould not try to gain a few hundreds. The one is, in fact, as abſurd as the other. The queſtion here is, What is ſufficient? Take our ſeaſons good and bad together, and there is not above a fortnight, or at the moſt three weeks in a year, in which it is neceſſary to feed ſheep with hay. In ſuch a winter as the laſt, a whole year's crop would be ſaved. Now I think, there are few farms where they might not raiſe ten or twelve acres of hay at a moderate computation; for want of which the farmer runs the riſk of loſing his ſtock almoſt every year. Add to this, that in the high lands there is little ground fit for tillage, conſidering the lateneſs of their harveſts; ſo that they could lay their dung on the field which they intend for hay, which would enrich it to ſuch a degree, as would raiſe a prodigious crop of graſs: Rather than do this, I am informed, that they caſt their dung (as we are commanded to do our bread) into the waters. As for the laſt objection, That they cannot get hands to make it; few will do all the buſineſs; and theſe, with a little trouble, might be got from ſome neighbouring village, where there are always abundance of idle people. Italy is a climate more fertile and warm than ours, except towards the Alps and Apennines, where it is cold and covered with ſnow in winter: In that country, one would ſuppoſe

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it was much leſs neceſſary to feed ſheep with hay than in this country; yet the great VIRGIL was by no means for leaving them to their ſhifts; for he ſays,

> Firſt with aſſiduous care from winter keep
> Well foddered in the ſtalls thy tender ſheep:
> Then ſpread with ſtraw, the bedding of the fold,
> With fern beneath, to fend the bitter cold:
> That free from gouts thou may'ſt preſerve thy care,
> And clear from ſcabs produc'd by freezing air *.

A little after, this humane author gives the reaſons for this care and attention:

> So much the more thy diligence beſtow
> In depth of winter to defend the ſnow,
> By how much leſs the tender helpleſs kind
> For their own ills can fit proviſion find.
> Then miniſter the brouze, with bounteous hand;
> And open let thy ſtacks all winter ſtand †.

I am, Sir, with reſpect,

Edinburgh, June 22d, 1773. Your moſt humble ſervant,

P. P.

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* Incipiens, ſtabulis edico in mollibus herbam
Carpere ovis, dum mox frondoſa reducitur aeſtas;
Et multa duram ſtipula filicumque maniplis
Sternere ſubter humum, glacies ne frigida laedat
Molle pecus, ſcabiemque ferat, turpiſque podagras.
VIRG. Georg. lib. III. l. 295.

† Ergo omni ſtudio glaciem ventoſque nivalis,
Quo minus eſt illis curae mortalis egeſtas,
Avertes: victumque feres, et virgea laetus
Pabula; nec tota claudes foenilia bruma. l. 318.

ARTICLE LXVIII.

Some Experiments made by a young Farmer; and Obſervations on PRO PATRIA'S *Letter*, p. 399.

[In a letter to the Publiſher.]

ALTHOUGH I am only an infant practical farmer, yet from a conſideration of the chimical, as well as the mechanical principles of agriculture, that truly philoſophical and uſeful, though much neglected, ſcience, I have become an apoſtate from the *good old huſbandry*, and a ſtrenuous advocate for the *new*; and have on that account been favoured by my neighbours, (who unhappily hate every thing that ſavours of innovation) with the appellation of a fooliſh giddy young man.

As a combination of all the flowers of rhetoric would not enhance the value of an eſſay in your publication, I ſhall not make any apology for the ſimplicity of my ſtile; but ſhall, without preamble, proceed to beg your or your correſpondents advice, with regard to the proper management of a farm, nearly of the following extent and quality: 400 acres arable, interſperſed with hillocks and jutty rock, the ſoil extremely light, but none ſandy; and a walk for 250 ſheep. It has hitherto been managed in exact conformity to the practice of this country. The infield, conſiſting of about forty acres, was courſed with bear, oats, peas; frequently bear, oats, oats, peas. The outfield, of about three hundred and ſixty, tathed, croped four or five times with oats, and leaed ſix years.

I preſent you with one or two extracts from my journal, that you may from that ſpecimen approve or diſapprove my conduct.

Auguſt 3d, Made a dunghill compounded thus:

1ſt, A layer of rich earth; *2d*, cow and horſe dung; *3d*, earth; *4th*, dung; *5th*, earth; *6th*, ſalt and lime. My reaſon for putting the ſalt and lime uppermoſt was, for fear they would

would retard putrefaction, and that they might attract nitrous particles from the air.

12th, Broke a field of lea to ly expoſed to the winter's froſt.

February, Prepared land for five bolls potatoes, which I planted thus: after three tilths and a harrowing, I meaſured the diſtance betwixt the wheels of my carts, and drew furs with a ſmall plough, exactly with that diſtance, along the whole field. I then cauſed a cart to follow the plough, with a wheel in each furrow, and dunged them; above the dung women and boys put the ſetts, and another plough covered the whole. I have horſe and hand-hoed them, and they now far excell any in this country that I have ſeen.

I have incloſed a piece of light infield with ditch, and a double row of whins, to prevent the earth from mouldering down; I pinned thin divots along the looſeſt parts: Planted the back of the ditch with kail, and the field with cabbage and turnips in three foot ridges; to be ſucceeded with barley, clover, and ryegraſs. I deſign to ſow along the drills the following compound: $\frac{1}{2}$ boll lime ſlacked in $\frac{1}{2}$ boll ſalt and urine, and 8 ſtones of oil-duſt to every acre. As this mixture not only contains much vegetable food, but will alſo prevent the fly, I hope it will produce a happy effect.

May 8th, Sowed barley upon the piece of lea, after a croſs tilth, and ſtrong harrowing. Put my dunghill upon a field exhauſted by thirteen ſucceſſive crops of grain, after lime only, and ſowed barley. Both fields now look ſo well, that my neighbours tell me it will be good for nothing, the ground being unable to carry it. Pray what ſhall I do to avert the preſaged diſaſter?

I will juſt make one or two obſervations on Pro Patria's letter [N° VIII. p. 399.] I do not *entirely* agree with this gentleman in ſome parts of it; he does not indeed advance any thing poſitively, but candidly enough refers his propoſals for your correſpondents and you to think upon. He firſt propoſes a total abolition of the diſtinction of infield and outfield. This up-

on ſome would be a moſt judicious ſtep, but would neither anſwer upon large nor hilly farms. It would be utterly impracticable upon thoſe in my neighbourhood, and I may venture to ſay the ſame for the one half of Scotland. Beſides, I am of opinion, that it might be productive of few good conſequences, as our common farmers will not be induced to relinquiſh corn, for fallow crops; and to ſuffer the infield to lye lea neither enriches nor cleans it properly.

He very juſtly blames the conduct of the majority of tenants, in keeping ſuch a ſuperfluity of horſes or cattle in their teams. I would imagine, that there is another fault they are guilty of, viz. yoking them by the neck; in this method the joints of the ſhoulders are curbed; nor do I think they puſh near ſo ſtrongly as they would, were they yoked by a ſmall open brechem, or a yoke ſtuffed like a ſaddle upon the forehead, and faſtened to the horns. As the experiment deſerves a trial, pray recommend it to ſome of your ingenious correſpondents to make.

For the cultivation of waſte lands, as the generality of them are of a light nature, I would prefer potatoes, or common kail, to every other crop, as they are known to turn well out upon new and light grounds. If clay or ſtiff ſoil, if moſſy or overgrown with bent, pare them with a denſhiring plough, mix the turf with ferns, thiſtles, &c. (which contain a vaſt quantity of alkaline ſalt) burn them, and having fallowed the ground, ſpread the aſhes, and ſow peas or beans.

Turfing in any other manner than by the plough would come ſhort of repaying expences. Heather, whins, croppings of trees, or broom, as manures, are liable to the ſame objection, unleſs a field of whins was to be improved, which may be done very advantageouſly by planting it with potatoes in the lazy-bed way; as whins are prevented from growing by covering their tops with earth.

He wants to know, how courſing with clover, wheat, peas, and oats would, or has anſwered: I believe very few have tried it,

it, as barley in place of oats would not only be a more profitable crop, but greatly preferable for reſowing clover. I would rather chuſe after clover to ſow barley to be ſucceeded by peas, wheat, turnip, barley, with graſs-ſeeds. He is certainly much miſtaken in his conjecture, that rye neither requires ſo rich a ſoil, nor is ſo ſcourging as oats; the contrary of which every practical farmer who has tried them will aſſert.

If you inſert this in your next, I will perhaps fill a ſheet to you again ſoon. Meantime, I am,

North ſide of Fife, Your conſtant Reader,
June 23d, 1773. PHILAGROS.

ARTICLE LXIX.

Of the improvement of Moor-grounds, continued from N° IX. *p.* 446.

[From YOUNG's Six Months Tour through the North of England, Vol. II.]

THOSE moors in which the coalliers farms are ſituated upon muſt be ranked under my *firſt* head of diviſions, and are conſequently of a very bad and unfavourable nature; and yet the products are very conſiderable. The common fellows gained turnips as large as their heads—oats from 40 buſhels to 132,——and 120 buſhels of potatoes. *Croſt* got 60 buſhels of oats the firſt crop, and then four more ſucceſſively of 40 each,——four quarters of rye—and 150 buſhels of potatoes.

Now it is very clear, that the land (with proper liming) that will yield ſuch productions, and with no better ploughing than can be effected with a ſingle galloway, muſt in its nature be very good; five ſucceſſive crops of oats, one would apprehend, ſufficent to exhauſt any ſoil; but this land evidently ſtood it well, from yielding good graſs afterwards, which I viewed.——While we viewed *Croſt*'s fields, Mr *Danby* aſked hi

this ſteward, who was preſent, what he could let ſuch graſs as all *Croft*'s at *per* acre? He replied, in quantities of any extent at 15 *s. per* acre, but in ſmall parcels of 20 or 30 acres at 20 *s.* An improvement which is aſtoniſhing, from land that was abſolutely and totally *waſte*. But the goodneſs of it alſo appears from *Croft*'s ſtock of cattle, and the quantity applied to feed a cow, which will be found not more perhaps than the medium quantity, through the cultivated countries of this whole tour.

It is from all theſe circumſtances evident enough, that this kind of moor-land is amply capable of improvement; and that there is nothing in the nature of the ſoil which gives any reaſon to doubt of rendering it exceeding good land. Theſe are facts that are totally indubitable.——The great queſtion is, the profit attending the improvement. The greateſt enemies to the cultivation of moors allow, that they are capable of being made good land; they only deny the expediency of the buſineſs. Let us therefore, in the next place, conſider that point.

But firſt I ſhould remark, that the *third* diviſion of moor-land, given above, [p. 437.] is of a ſuperior quality to the firſt and ſecond, brakes and whins being allowed by all the neighbours of the moors to be ſure ſigns of good land; conſequently the *fourth* is better than the *third*. The *fifth* diviſion is univerſally allowed to be better than any ſoil that is black and yields ling. The *ſixth*, that is, the boggy moors, are reckoned in the north very bad, but I believe rather from the ſuperior expence of the improvement, than from experimental knowledge, and that for reaſons which I ſhall offer hereafter, when I give a calculation of their improvement. The *ſeventh* ſoil is reckoned much better than the ſixth. As to the *eight* diviſion, it is needleſs to mention it, being of itſelf only, with incloſing, richly worth 15 *s.* an acre.

From this ſlight review, it is plain, that the great point is the improvement of the *firſt*, *ſecond*, and *ſixth* diviſions, they

being not only the moſt doubtful, but much the moſt common ſpecies.

The firſt buſineſs in all improvements is the incloſure, which, upon many of the moors, is a matter of no difficulty to determine, as immenſe tracts are abſolute property, without any right of commonage. The only method of incloſure uſed here is that of ſtone walls, and moſt excellent fences they are: The ſtones ſcattered over the land they looſen from the earth with wedges, and ſplit them into ſmall pieces; theſe they lay upon each other very artfully, building with them the walls, which are not only very ſtrong (laſting in full perfection beyond the memory of the oldeſt man), but have likewiſe a neat and good appearance A ſmall addition of the expence will cut them all into regular oblongs, which makes them look to the full as well as any the moſt regular brick walls.

The expence of cutting (in the common manner), leading, and building the walls ſix feet high, is 5*s*. 6. *d*. *per* rood, of ſeven yards running meaſure *.———The gate-poſts are of ſtone, and excellent ones; their coſt ſcarce any thing; a gate, irons, and poſts, coſt 5 *s*.

Upon theſe data we will proceed to calculate the expence of incloſing a given number of acres.

In a ſquare mile of land there are 640 acres; ſuch a tract, divided into fields of 71 acres each, will lie as in fig. 1. each line a mile long; conſequently there will be eight miles of walling,—alſo ten gates.

* In Scotland, the walls or dykes are commonly built by the ſquare rood of 36 ells: and the common heighth is only ſix quarters or 1½ ell, which is reckoned a ſufficient fence. The price varies in different places, and is much affected by the diſtance at which the ſtones are to be led. But from the ſpecimen of calculation here given by Mr Young, every man may inſtitute a calculation according to the rates at which the work can be done in his neighbourhood.

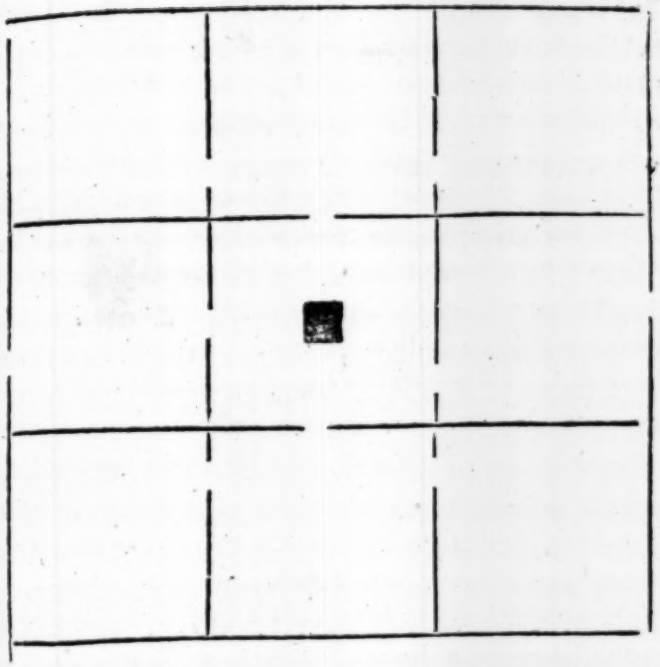


Fig. 1.

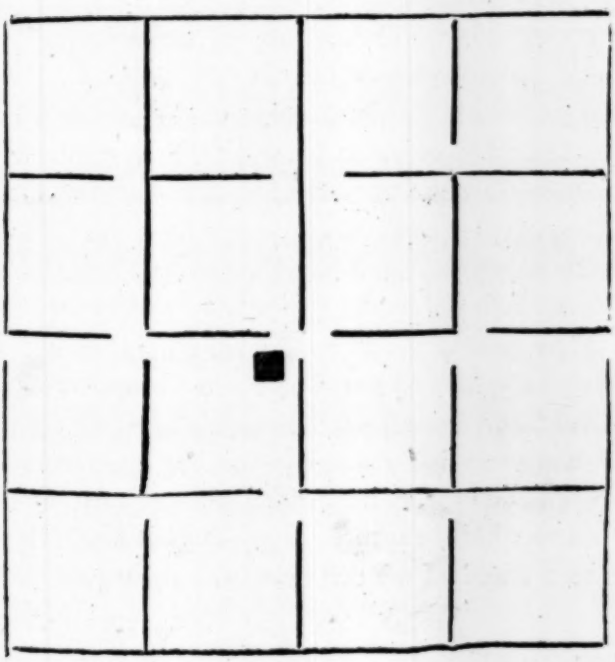


Fig 2.

The

The expence will be,

Eight miles at 5 *s.* 6 *d.* a rood, — —	£.	550
Ten gates, *&c.* the coſt in this country 5 *s.* but as they are indifferent ones, I will ſay 10 s.		5
Total incloſing, - - -		555

In the next place, the buildings neceſſary are to be conſidered; theſe are a large barn, ſtables, cow-houſe, and hog-ſties, beſides the dwelling-houſe. All theſe, I was informed by ſeveral gentlemen in this country of large eſtates, could be raiſed of ſtone and ſlate, for 300 *l.* but to obviate objections, I ſhall ſuppoſe 400 *l.*

It ſhould here be remarked, that ſcarce a ſquare mile of moor is to be found which would not be cleared of ſtones by theſe diviſions, and the buildings; the very ſtoney parts being ſeldom of greater extent than from 10 to 30 or 40 acres: It would be an advantage to have ſuch a ſpot in a ſquare mile, as much of it probably would be found with an inſufficient quantity of ſtone to divide itſelf. At firſt ſight, the ſtony moors appear very tremendous with an eye to improvement, but a little experience will ſhew theſe formidable ſtones in a much more advantageous light. A gentleman, who has a large range of waſte property, may as eaſily throw a ſtony ſpot into the middle of his improvement, as leave it on one ſide, and then the buildings will be erected as it were in the midſt of a quarry; the advantages of which are too obvious to require explaining.

The next buſineſs is the paring and burning the whole tract. From various and repeated intelligence, and obſervation, this I am perſuaded is the beſt method of breaking up all uncultivated lands, and perhaps I might add the beſt of lands. The expence is 16 *s.* 6 *d. per* acre; or for the 640 acres 528*l.*

Liming comes next, which, upon this peculiar tract of moors, is a very heavy expence; as no lime has hitherto *accidentally* been found: I uſe that term, as ſearching for it in a ſpirited

ſpirited manner has never yet been done: In the preſent ſtate of things, lime coſts 14 *s.* 6 *d.* a chaldron, carriage included, but, if brought by the cultivator's own teams, would come much cheaper. Two chaldrons *per* acre ſhould be ſpread with the aſhes; it is more than the farmers uſe, and ſuperior to *James Croft*'s annual liming, as this land is not to be cropped as his was. The expence of 1 *l.* 9 *s. per* acre is 925 *l.*

Theſe are the great objects of improvement. If a gentleman does not chuſe the trouble of farming the land till it is laid down in graſs, he may ſtop here, and let the farm, leaving to the tenant (under proper reſtrictions) to reap the profit of the whole. Upon this plan we will next ſtate the whole expence.

	£.
Incloſing,	555
Buildings,	400
Paring and burning,	528
Liming,	925
Total,	2408

Having formed this calculation, I was very deſirous of knowing what the land in that ſituation would let for; and with this view I applied to Mr *Danby*, who conſulted not only his ſteward, but ſeveral farmers: I likewiſe aſked the opinion of other gentlemen, who had attended peculiarly to theſe matters: Several aſſerted, that ſo complete a farm, in ſuch excellent repair, and ſo thoroughly fenced, all the land improved, and manured, would let with the utmoſt eaſe for 15 *s. per* acre: Others reckoned 12 *s.* the value; and ſome thought 10 *s.* would be an adequate rent: The latter is evidently beneath all reaſon; but, however, I ſhall take it into the calculation, and ſtrike the average of the three, or 12 *s.* 6 *d. per* acre; 640 acres, at that rent, amounts to 400 *l.* a year. This income from 2408 *l.* is better than at the rate of 16½ *per* cent. The *clear* profit will be as follows:

Rent

Rent of the farm, - - £. 45
Intereſt of 2408 *l.* at 4 *per cent.* ſomething better than* £. 9

Clear profit, *per ann.* - - - 3[illegible]

If this calculation, founded on the very beſt authority, an exaggerated in not one particular, does not prove the immen profit of improving moors, nothing can; nor is there an in diſputable truth in all nature. How loudly does it call upo their proprietors to awake from the ſtrange lethargy in whic they have been dreaming for ſo many ages! The cultivatio of a large tract of this land is an object of great im portance to the largeſt fortunes; for the improvemen amounts to near 10 *s.* an acre annual income; and the nobi lity and gentry in the north do not reckon their moors b hundreds of acres, but by thouſands.

It is obſervable, that this improvement may be effecte without a gentleman's taking any of the trouble or riſk o farming, ſince the lime is all brought for hire, and the parin and burning done by men alone, without horſes.

But a very great and material object in the improvement o moors in queſtion is the diſcovery of lime-ſtone; there is lim burnt within a few miles of them every way; I can therefor have no conception but a lime-ſtone quarry might be foun ſomewhere in ſo vaſt a tract of country; that it has not bee found, is no argument againſt the probability; ſince the onl perſons that uſe it are the neighbouring common farmers who have no ideas of attempting any thing out of the ol route, which they and their forefathers have long been uſe to: An accurate and vigorous ſearch for it has never bee made. I have little or no doubt but ſucceſs would attend ſuc an attempt; and from that moment improvements would b

work

* The tenants keep every thing in repair, ſo there are no de deductions; likewiſe an eſtate gained without a land-tax.

worked at much leſs expence; for the greateſt article in the preceeding account is the lime, at ſix miles diſtance.

Before I conclude this ſtate, I ſhall vary the ſuppoſition a little; and ſuppoſe that fields of 72 acres would be too large to clear away the ſtones. I ſhall therefore ſuppoſe the diviſion 40 acres, (ſee fig. 2.) in which caſe there will be ten miles of walling.

The expence then will be,

Ten miles, at 5 *s.* 6 *d.* - - -	£. 687
Sixteen gates, *&c.* at 10 *s.* - - -	8
Buildings, - - - -	400
Paring and burning, - - - -	528
Liming, - - - - -	925
	2548

100 *l.* a year, from this principal, is 15 ½ *per cent.*

Rent, - - - -	£. 400
Intereſt of 2548 *l.* at 4 *per cent.* - -	102
Clear profit, - - -	298

This proportion will enable you to conceive that of ſmaller diviſions: The remarks before made remain equally applicable to this account, or to that of 20 acred diviſions.

The improvement of the boggy moors, which is the *ſixth* article, is in all reſpects the ſame as the preceeding, except the article of draining, which is the firſt buſineſs to be undertaken: This muſt vary according to the nature of the land; if it is ſtony, the ſmaller ſort of drains (provided the bog is not ſo deep that they would ſink and be buried, which upon the moors is ſcarce ever the caſe) ſhould be covered ones; but if ſtones are ſcarce, then the drains ſhould all be open; the expence of the improvement depends upon the number of the drains, which muſt neceſſarily be various in every acre of land, conſequently no exact eſtimate can be made: But the profit of draining them cannot be doubted, for there is great

reaſon

reaſon to apprehend the ſoil of theſe wet parts naturally mo
fertile than the dry ones; the aſhes of them, when burnt, a
a moſt excellent manure, and the crumblings of the drie
peats are the ſame, as Mr *Danby* experimentally knows. Bu
I forbear to enlarge further upon an article in which I hav
not the ſame authorities for reaſoning, as I had with the forme
claſſes.

Laſtly, I muſt remark upon this ſubject of improving moor
that a more profitable field remains yet to be mentioned
which is the moor-ſide farms. Mr *Danby* has ſome thouſand
of acres of theſe, and other gentlemen the ſame. I kno
not one who hath not very large tracts of moor-land annexe
and incloſed, but which remain in the ſame unimproved ſta
as the moors themſelves, all the profit of them being the con
veniency of the ſheep they feed not rambling at large. No
the improvement of theſe farms would be particularly profi
able; as the incloſures and buildings are already done, conſe
quently, in the above account, the expences would only b
paring, and burning, and liming. The very mention of thi
ſyſtem of improvement is ſufficient; it muſt be obvious to th
meaneſt capacity that the profit would be immenſe.

Upon the whole, the improvement of theſe moors would no
only yield a prodigious profit clear to the undertaker, but woul
prove a moſt noble work, conſidered in a national light; i
would add vaſtly to the production of food of all kinds, be
very great aſſiſtance to the manufactures that are connecte
with agriculture, and employ a great number of moſt valu
able people; in a word, it would prove a ſource of glor
and profit to the undertaker, of riches and population to th
public.

THE SCOTS FARMER,

AUGUST 1773.

ARTICLE LXX.

Of Manures and their Operations—Of the different kinds of Manures—Of Dung—Of Dung mixed with Vegetables in a Dunghill—Of Lime—Of Marles—Of Clay and Stone Marles—Of Shell-Marle.

[Dickſon's Agriculture, Vol. I.]

Of Manures and their Operations.

MANURES are ſubſtances, which, when mixed with the earth, greatly promote vegetation. To apply them in ſuch a manner as moſt effectually to promote it, it is of importance to know their natures, and the ways in which they operate.

Manures operate in all the different ways by which vegetation is promoted. *1ſt*, By communicating to the ſoil with which they are mixed, the vegetable food, which they contain. *2dly*, By communicating to it a power of attracting the food in greater plenty from the air. *3dly*, By enlarging the vegetable paſture which it contains: And *laſtly*, By diſſolving the vegetable food, which it is already poſſeſſed of, and fitting it for entering the roots of plants.

Manures are very different in their natures: Some of them operate in all the ways mentioned; and there are none of them that do not operate in more ways than one. They are found to enrich the beſt pulverized ſoil, and to do this again and again, after it is exhauſted by crops. It is almoſt an univerſal practice in Scotland, to lay dung upon land that is kept conſtantly in tillage, once in three, four, or five years. It is

obſerved, that after the dung is laid on, the land becomes rich, and that the crops turn gradually worſe and worſe, till the whole virtues of the dung are exhauſted: And it is alſo obſerved, that immediately upon the dung being again applied, the land becomes rich as before. It is natural to conclude from this, that dung promotes vegetation by encreaſing the quantity of the vegetable food.

It is found, that ſome manures loſe part of their virtues by being long expoſed to the air. After dung is ſufficiently rotten, the longer that it lies, it becomes of leſs value, and does not enrich ſo large a quantity of land as when uſed in proper time. The dung of cows dried upon their paſture, gathered and laid upon other land, is ſcarcely to be diſcerned in its effects on the crops produced: The ſame quantity applied, whether carried from the byre, or by folding the cattle, enriches the land. From this it is obvious, that this kind of manure contains the vegetable food in itſelf and does not receive it from the air.

It is found, that ſome manures operate ſooner, and with greater violence, the longer that they are expoſed to the air before they are uſed. Lime and marles are of this kind; the longer they ly expoſed, they operate the ſooner; and it is obſerved that they have a ſtrong power of attracting the virtues of the atmoſphere. From theſe things it is reaſonable to infer, that theſe manures operate by communicating to the ſoil, with which they are mixed, a power of attracting the vegetable food from the air.

It is obſerved, that ſome manures exhauſt land of its vegetable food, and do not reſtore it again when immediately applied: This is found to be the caſe with lime. Land thoroughly limed has been found to carry many very good crops: By degrees however, the virtues of it have been exhauſted, and the land reduced to a worſe ſituation than before the lime was laid on. In this ſituation lime has been applied a ſecond time, but its effects found to be far inferior to what

they were when firſt applied. This is ſufficient to convince us, that the manure operates by diſſolving the vegetable food which it meets with in the ſoil, and fitting it for entering the roots of plants.

It is certain, that all kinds of manures open the ſoil. Any perſon will be convinced of the truth of this, who will take the trouble to compare a piece of land, on which dung or any other manure has been laid, with a piece contiguous that has not been manured; he will find the one much ſofter, much more free and open than the other. It muſt be allowed therefore, that all manures operate by enlarging the vegetable paſture.

Of the different kinds of Manures.

The manures to be procured in Scotland, are theſe following; dung, marle, aſhes, ſoot, ſea-weed, ſhells, ſown vegetables, and water. There are ſeveral other things that are very rich manures, ſuch as rags, leather, &c. But as theſe are to be procured only in ſmall quantities, it is needleſs to treat of them ſeparately.

Of Dung.

Dung is commonly uſed to ſignify not only the excrement of animals, but alſo all rotten vegetables when uſed as manures: but here we ſhall take it only in the firſt ſenſe: and when its qualities are conſidered, it will appear, that it promotes vegetation in all the different methods formerly mentioned—It promotes vegetation by encreaſing the vegetable food. It is compounded of the ſame principles of which the vegetable food itſelf is compounded: and this is confirmed by the experience of all places and ages; and it is what no perſon will doubt of, who conſiders that it has the ſame effects upon lands of all kinds and in all ſituations.—It promotes vegetation by enlarging the paſture of plants; it attracts acids from the air and ſoil; and by raiſing a fermentation with them, thereby ſeparates the particles of the ſoil with which it is mixed. Every farmer knows the truth

truth of this from experience: The land upon which dung is laid, though naturally ſtiff, becomes ſoft and mellow, and is more eaſily plowed than before—It promotes vegetation by communicating to the ſoil a power of attracting the vegetable food from the air: for the earth which it contains is of the abſorbent kind, and attracts all the other principles of the vegetable food;—and it likeways promotes vegetation by preparing the vegetable food for the nouriſhment of plants; for by the ſalts which it contains and produces, it not only attracts oils, which is probably one of the principal ingredients of every plant we cultivate in the field; but diſſolves them, and thereby makes them fit to mix with water, and thereby to enter the roots of plants. But though it operates in all theſe ways, it it is more than probable that it principally operates by encreaſing the food of plants; and this ſeems to be confirmed by experience; for when the virtues of dung are exhauſted, the ſoil is no poorer than before it was laid on; which is not the caſe with moſt other applications.

Some new improvers are pleaſed to ridicule the old farmers, becauſe they are ſo fond of dung; but none will do this who attentively conſider the virtues of it. Such other manures as can be obtained, are to be uſed; and tillage is carefully to be attended to: but none of theſe are to ſuperſede the uſe of dung, which can be employed to ſo great advantage.

Though dung in general has all the qualities mentioned, yet there are ſome kinds of it poſſeſſed of ſome of theſe qualities in a higher degree than others. There are as many kinds of dung as there are of animals; and in ſome reſpects they all differ one from another.

The difference between one kind of dung and another is commonly ſuppoſed to ariſe from the different food of the animals. Green herbage, ſtraw or hay, do not contain ſo much vegetable food in the ſame quantity as grain does: Hence it is ſuppoſed, that the dung of cows is not ſo rich as that of horſes, or the dung of horſes ſo rich as that of fowls.

But this difference muſt partly ariſe likewiſe from the nature of the animals, if it is true that the dung of horſes, cows, ſheep, hogs, and geeſe, all differ one from another, though fed upon the ſame paſture. Some animals digeſt their food more quickly than others: this makes a difference in the dung produced by the ſame food. Some things are digeſted and turned into a ſtate of corruption by ſome animals, that paſs through others ſound and undiſſolved: the matter then in the ſtomach that digeſts the food, muſt be different in the different animals; and the dung muſt partake ſomething of the nature of this, which makes another difference in the dung produced by the ſame food.

Some writers in agriculture treat of the dung of the different animals ſeparately: but it is needleſs to do this, for it requires more pains and expence to keep them ſeparate, and uſe each of them by itſelf, than all the advantages ariſing from this way, above the ordinary way, can poſſibly amount to. The dung of fowls, particularly of pigeons, is an exception to this. It is commonly uſed without any mixture; and it can be kept ſeparate from other dung without any trouble or expence: It is obſerved, that the effects of it are more violent, and ſooner over than the effects of common dung. The effects of ſome other kinds of dung would perhaps be the ſame, if they were uſed without any mixture. The pigeons dung, being thoroughly corrupted, ſoon diſſolves, and becomes vegetable food: but the ſtraw, with which the other kinds of dung are commonly mixed, not being ſo thoroughly corrupted, prevents the effects of them from being ſo violent, and ſo ſoon over. The way, in which pigeons dung operates, points out the manner in which it ſhould be applied: as it is very rich, and its qualities ſoon exhauſted, a very ſmall quantity ſhould be applied, in proportion to the quantity of other dung: if care is not taken of this, the crop will be deſtroyed by being too luxuriant. Perhaps mixing it with ſome other things may have good effects: the ſtrewing ſmall chaff of any kind,

kind, from time to time, on the bottom of the pigeon-houſe is very proper; for the chaff ſucks up the moiſture, and makes it eaſy to reduce the dung to powder, which is an advantage, for thereby the dung is ſcattered more equally, and manures a greater quantity of land.

It is a cuſtom in ſome places, to fold ſheep and cattle for the ſake of their dung. Some writers on huſbandry give particular directions how to do this in the moſt advantageous manner. But it is needleſs to conſider theſe: the farmer muſt conſult the advantage of his ſheep and cattle, and not the advantage of the land by the dung; and therefore muſt fold them in the moſt convenient manner. A ſcore of ſheep with the beſt management in folding, will not produce much more than ten ſhillings worth of dung in the ſeaſon, above the expence of folding; a ſum ſoon loſt by an injudicious folding of them.

Of Dung mixed with Vegetables in a Dunghill.

Dung is commonly mixed with vegetables, and allowed to ly for ſome time before it is uſed. Straw is thrown below the cattle, and this is carried out along with the dung, and thrown upon the dunghill. On the dunghill is alſo thrown all the ſtraw that is left after ſerving other purpoſes, and all the refuſe of vegetables and animals, uſed in the farmer's family. In the management of dunghills, two things are always to be kept in view: The promoting putrefaction; and the preventing the vegetable food from flying off into the air, or being conveyed away by water. The ſtraw and other parts of uncorrupted vegetables, of which the dunghill is compounded, make it neceſſary to keep the firſt in view; and the ſalts and oils, which by corruption are rendered volatile, and the water which extracts the virtues of dung, make it neceſſary to keep the laſt in view.

To promote putrefaction, the ſituation of the dunghill ſhould be dry, and the dung laid together as thick as is convenient.

venient. Putrefaction, indeed, cannot be promoted without water: but the quantity that falls in rain, with the natural ſap of the dung, is ſufficient for this purpoſe. Too much water prevents that fermentation which carries on the proceſs of putrefaction moſt quickly. This is confirmed by experience: if there is any part of a dunghill ſoaked with water, it is obſerved, that the ſtraw is quite ſound; while, in other parts that are dry, it is completely rotten.

To promote putrefaction, the dung ſhould be laid thick together; thereby the heat is the ſooner generated, that produces the putrefaction; and thereby the natural ſap is the better preſerved, which prevents the dung from being burned. When the natural ſap of the dung is exhaled, and the dung afterwards covered, the heat is in danger of riſing to ſuch a height, as to burn the dung. This muſt be carefully guarded againſt: for, when the dung is burned, its ſtrength is exhauſted, and it is rendered almoſt uſeleſs. Dung, in this ſituation, is dry and white; the plowmen call it *fire fanged*. When thus burnt, it is found, from experience, to have loſt almoſt all its virtues. To prevent the dung from being reduced to this ſituation, when it is carried out of the ſtable or byre, particularly if there is much ſtraw in it, it muſt not be laid in heaps, which makes it dry too faſt, but carefully ſpread thick upon the top of the dunghill. This prevents the ſap from being carried off by the wind, and thereby prevents the heat from being raiſed to ſuch a height as to burn the dung.

It may be obſerved, that, when graſs is cut green, and immediately thrown into a heap, it heats, and this heat ſoon reduces the graſs to a ſtate of putrefaction. But, if the graſs is for ſome time expoſed to the air, and then put together without being ſufficiently dry, it heats alſo; but, inſtead of being reduced to a ſtate of putrefaction, is burned. So it is with dung: if, when carried out, it is laid in ſmall heaps, being thereby too much expoſed to the air, it loſes its ſap, and being afterwards covered, the heat is raiſed to ſuch a height, as to burn it; but, if it is ſpread thick upon the top of the dunghill, it retains the ſap and putrefies.

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A diſtinction is here made betwixt dung putrefied and burned; and this diſtinction is repreſented as important. And it is abſolutely neceſſary that the farmer makes this diſtinction; for, when the dunghill is allowed to heat to ſuch a degree as to burn the dung, the value of it is thereby greatly leſſened.

To prevent the vegetable food from being conveyed away, no foreign water, excepting what falls in rain, muſt be allowed to run into the dunghill; and the ſituation of the dunghill, if poſſible, ſhould be high at the ſides, and hollow in the middle. When foreign water is allowed to run into the dunghill, the fermentation is not only ſtopped, but, as it is often neceſſary to allow the water a paſſage from it, thereby much of the food is conveyed away. When the bottom of the dunghill is quite level, the rain, which ſometimes falls in heavy ſhowers, eaſily finds its way off; but this is prevented by making it high at the ſides, and hollow in the middle.

The only way to prevent the vegetable food from being exhaled by the ſun, or carried off by the wind, is to cover the dunghill. The covering the dung would certainly be an advantage, if it could be eaſily executed. If it was not for the additions that are daily made to it, earth would be very proper for this purpoſe. Some perſons aſſert, that, by covering the dunghill, it would loſe the influence of the air; and it is the air alone, they ſay, that makes it fit nouriſhment for vegetables; and, therefore, recommend the expoſing it, particularly to the north and north-eaſt; becauſe the wind from theſe points brings along with it more aereal nouriſhment than from the others. If the dunghill contained no vegetable food, but what it received from the air, this direction would be very proper: but, as the dunghill contains in itſelf all the ingredients of the vegetable food, and as its juices, the more it is putrefied, become the more volatile, the vegetable food in it, by being expoſed to the air, inſtead of being encreaſed, would be diminiſhed. The covering the dunghill, therefore, would be an advantage. But the difficulty lies in executing this.

Some

Some propoſe to dig a large pit, lay the bottom with flags, build up the ſides with ſtones, and cover it with a roof. This, it muſt be owned, will retain the juices, and promote corruption, as well as prevent the vegetable food from being exhaled. But then it muſt be ſo expenſive, that few will be engaged to make trial, unleſs the benefits are more obvious than the aſſertions of the contrivers make them: and, beſides the expence, it muſt likewiſe be attended with inconveniencies. In ſome ſituations, it will be very difficult to prevent too much water from getting into it; and as difficult to get the dung itſelf carried out.

The method which we propoſed for preventing the dung from over-heating, will alſo, in a great meaſure, ſerve this purpoſe. The dung, when it comes from the ſtable or byre, is mixed with ſtraw, which abſorbs the juices, and prevents them from flying off, till the ſtraw itſelf begins to putrefy. When in this ſituation, it is laid thick upon the top of the dunghill, a ſmall ſurface only being expoſed to the air, and being covered before the ſtraw begins to putrefy, the juices, in a great meaſure, are preſerved. A perſon, by the ſmell, is ſenſible that the juices of the dung are not ſo volatile, when firſt laid upon the dunghill, as after they have been covered for ſome time, and then expoſed to the air.

Dung, expoſed to the ſun and wind, or waſhed by rain, loſes its vegetable food; it ought, therefore, to be plowed in as ſoon as is poſſible, after it is laid upon land. Some perſons aſſert, that they have found from experience, that dung is nothing worſe, though it ly a conſiderable time ſpread upon land, in dry weather, before it is plowed in. This, if true, is contrary to what has been ſuppoſed, that the vegetable food is exhaled by the ſun, and carried off by the wind. It is probable, that, after dung is ſpread upon land, its fermentation ceaſes, and the ſalts and oils remaining in it may become fixed, and may continue ſo till a new fermentation is raiſed by mixing the dung with the ſoil; and that, by attract-

ing acids from the air, more ſalts may be formed. By this its effects will be more ſudden and violent, but ſooner over.

It may be proper alſo to obſerve, that as the juices contained in the dung are waſhed downwards by the rain, it ſhould be plowed in with a very ſhallow furrow; excepting when the dung is not ſufficiently rotten. In this caſe it requires a deep furrow to cover it.

The better that dung is mixed with the ſoil, the purpoſes of vegetation are the better anſwered; all parts of the ſoil receive equal benefit, the vegetable food is equally diſtributed, and in all parts the fermentation equally promoted. When dung then is laid on land, it ought to be ſpread as equally as poſſible. This likewiſe prevents the breeding of vermin, which happens in ſome ſoils, when the dung is left in too large pieces.

Of Lime.

Some are of opinion that lime is only a *ſtimulus*, that is, that it promotes vegetation, only by making the ſoil with which it is mixed exert itſelf. Others, that it promotes vegetation by enriching the land, and adding to the quantity of vegetable food—The firſt ſupport their opinion by obſerving, that the crops, which lime enables land to produce, exhauſt it in a remarkable manner. It is a certain fact, that land thoroughly limed may be reduced to a much poorer condition by cropping, than land can be reduced to that is not thoroughly limed. It is poſſible to reduce limed land almoſt to a *caput mortuum* or dead ſubſtance; and the better and the oftener the land is plowed, this is done the ſooner. The other opinion is ſupported by obſerving, that in ſome places, lime is applied regularly once in four or five years; that the land ſeldom gets any other manures; that it is kept almoſt conſtantly in tillage; and, with the aſſiſtance of fallowing, carries very good crops.

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From theſe obſervations, one is led to conclude, that lime acts both ways; not only makes land exert itſelf in the nouriſhment of vegetables, but alſo enriches it and adds to the vegetable food.—It will not be improper therefore to point out how lime is to be applied, that ſo it may chiefly anſwer the one or the other of theſe purpoſes.

In uncultivated land, in which there is a large quantity of vegetable ſubſtance, lime ought to be uſed chiefly as a Stimulus: and when improved land needs a recruit of vegetable food, it ought chiefly to be uſed as a manure.

When lime is intended for a Stimulus, a large quantity ſhould be applied at once: for it takes a conſiderable quantity to diſſolve roots, and the other vegetable ſubſtances in the land, and to produce a high degree of fermentation. Root-weeds, when torn up by the plough, have their growth checked, and are for ſome time in a languiſhing condition; and if lime is applied to their roots while in this ſituation, by its diſſolving power it is apt to deſtroy them.

When lime is intended for a manure, a ſmall quantity applied at a time is ſufficient. It is probable, that it requires only a ſmall quantity of lime to impregnate a large quantity of earth, and to communicate to it an abſorbent quality, or power of attracting the vegetable food from the air, in as high a degree as it is capable of receiving; and it is certain that it is in proportion to this abſorbent quality which it communicates, that the ſoil is enriched by it. It is certain that a ſmall quantity of lime will impregnate a large quantity of water, and communicate to it all its virtues, and theſe in as high a degree too as it is capable of receiving: it is not improbable therefore, that it may operate in the ſame manner upon earth: If a ſmall quantity of lime then, communicates this abſorbent quality to a large quantity of earth, but has not ſuch influence in diſſolving vegetable ſubſtances, or in producing fermentation, it follows, that the ſmaller the quantity is which is applied, it will operate the more

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as a manure, and the greater the quantity applied, it will operate the more as a Stimulus. It is proper to obſerve likewiſe, that when lime is applied in ſmall quantities as a manure, it is neceſſary to repeat the application frequently; for it is probable that the ſoil by action loſes the abſorbent quality, which the lime communicates.

Theſe things which we have obſerved concerning the operation of lime in ſmaller and larger quantities, are in ſome meaſure confirmed by experience. They are agreeable to the practice in thoſe parts where lime is moſt uſed: When barren land is to be improved, it is laid on in large quantities; and when it is applied to land already improved, it is laid on in ſmall quantities, and frequently once in three or four years.

As lime operates by attracting the vegetable food from the air, the longer that it lies expoſed to the air before it is plowed in, it will exert itſelf the more quickly, and with the greater violence. Some alledge, that this ſhould not be done in ſummer; for they ſay that the ſun acts contrary to the air: as the air ſupplies the ſalt, the ſun exhales it, and communicates it again to the air. It is obſerved, that the lime of old walls, which has been long expoſed to the air, and where this ſalt is already formed, is much more ſudden in its operations when laid upon land than quick lime.

As lime, when laid on in large quantities, exhauſts land of its vegetable food, it is neceſſary to ſupply this food by dung, or ſuch other manures as have it in greateſt plenty; or the land ſhould be managed in ſuch a manner, as to prevent, as much as poſſible, the vegetable food from being exhauſted. Laying off land, after a very few crops of corn, into graſs for paſture, is the moſt proper way of doing this. Land, when paſtured, has not its vegetable food ſo much exhauſted, as when it carries corn; for the quantity of vegetable food carried off in fleſh by the cattle, or conveyed to the air by their perſpiration, bears but a ſmall proportion to the quantity carried off by a crop of corn and ſtraw.

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It is neceſſary likewiſe to obſerve, as lime communicates its virtues to water, that land inclining to be wet, and from which the water has free acceſs away, is not proper for it; for the water in running off, carries along with it the virtues of the lime. If the ſoil is light and ſpungy, and has no ſolid bottom, lime by its weight will ſoon penetrate beyond reach of the plough: this kind of ſoil is therefore not proper for it.

In the different parts of Scotland, a great quantity of land has been improved by lime: there is ſtill remaining a much greater quantity capable of being improved in the ſame manner: But ſome farmers are deterred by the great expence of the improvement. It may not be amiſs, therefore, to make a calculation to aſſiſt the farmer in judging whether or not he may ſafely riſk this expence. I muſt acknowledge, that calculations in matters of this kind are very deceitful, and that by them perſons are often miſled. However, the farmer, when he propoſes to improve, muſt make a calculation, not only of the preſent value of his land, but alſo of what it may be reaſonably ſuppoſed to amount to when properly improved. To aſſiſt him in this, is the deſign of the following calculation.

The land in Scotland capable of the greateſt improvement by lime, may be divided into two ſorts; out-field land and muir. The out-field land is commonly managed in this manner: it is kept three years in tillage, and carries three crops of oats, then is allowed to reſt ſix years, after which it is brought again into tillage. Now let us conſider what is the real value of an acre of this land in theſe nine years, and let us compare it with what may be reaſonably ſuppoſed to be the value of it if ſufficiently limed. The difference betwixt theſe is the expence which the farmer may lay out in this improvement.

Let us ſuppoſe then, that this acre of land, when in tillage, produces on the firſt year three bolls, on the ſecond three, and on the third two and an half, all oats; that on the firſt three of the ſix years graſs, it is worth 2 *s.* 6*d. per ann.* and on the laſt three it is worth 4 *s.* The account of the produce is as follows:

8½ Bolls oats, at 8 *s.*		£. 3	8 0
3 Years in graſs at 2*s.* 6*d.*		0	7 6
3 Ditto at 4*s.*		0	12 0
		4	7 6
From which to be deducted, 3 Bolls oats for ſeed	1 4 0		
3 Times plowing at 4*s.*	0 12 0		
		1	16 0
		£. 2	11 6

Now, if this acre of out-field land is fallowed and properly limed, (that is, at the rate of 60 bolls ſhells, each boll weighing about 2¾ Cwt. and producing about two bolls powdered lime, Wincheſter meaſure) it may be ſuppoſed, that it will produce on the firſt year five bolls oats, on the ſecond three bolls peaſe, and on the third ſix bolls barley. And if graſs ſeeds are ſown with the barley, that on the firſt year it will produce 150 ſtones of hay, and on the ſecond 100 ſtones; and that on the remaining four years, it is paſtured and worth 8*s per annum.* The account of the nine years produce, is therefore as follows:

5 Bolls oats at 8*s.*		£. 2	0 0
3 Ditto peaſe at 7*s.*		1	1 0
6 Ditto barley at 9*s.* 6*d.*		2	17 0
250 Stones of hay at 3*d.*		3	2 6
4 Years in graſs at 8*s.*		1	12 0
		£. 10	12 6
To be deducted:			
Graſs loſt on the year of the fallow	£. 0 4 0		
3 Times plowing the fallow, one for the peaſe and three for the barley, in all 7, at 4*s.*	1 8 0		
Seed:			
1 Boll oats	0 8 0		
1 Ditto peaſe	0 7 0		
1 Ditto barley	0 9 6		
Graſs ſeeds, 16 lb. clover at 4*d.*	0 5 4		
½ Boll rye-graſs	0 5 0		
		3	6 10
		7	5 8
Produce before liming		2	11 6
		£. 4	14 2

Thus we ſee, that in nine years, this acre of out-field land, if properly limed, will produce the value of L. 4 : 14 : 2, more than it produces in its preſent ſtate; and therefore, that this ſum can be afforded for lime, and at the ſame time an improvement made: for, by this management, the land, at the end of the nine years, muſt be in a much better ſituation than before it was limed. It may be obſerved, that in this calculation, there is no value put upon the ſtraw, and nothing allowed for ſhearing, &c. Theſe are ſuppoſed to ballance each other. The farmer muſt judge of this, as indeed he muſt do of every article in the calculation; in which it is probable, that there are ſeveral errors; at leaſt, that there are ſeveral articles that will not anſwer every part of the country. Exactneſs is not pretended; nothing more is propoſed than to point out to the farmer the way of calculating in matters of this kind; the quantity of the produce of the land, the value of the ſeveral articles, and the amount of the expence muſt be left to his own judgment. There is another thing omitted in this calculation, the intereſt of the money laid out in this improvement. The farmer muſt judge, whether or no this is balanced by the greater quantity of dung produced by the improved land.

Of Marles.

There are a variety of marles, which are commonly reduced to three ſorts: The clay, the ſtone, and the ſhell.

The firſt has its name from its ſimilitude, in appearance, to clay; the ſecond from its hardneſs, and ſimilitude to ſtone; and the third from the ſhells, with which it is mixed, or rather of which it is compounded *,

Of

* Though the ſhells, of which this marle is compounded, are quite putrefied; yet they ſtill retain their ſhape and figure. An animal having a reſemblance to the ſhells in the marle, it is ſaid, is to be ſeen in ſome mariſhes.]

The clay and ſtone marles are of the ſame nature; the ſhell marle is very different from both. This makes it neceſſary to treat of them ſeparately.

Of Clay and Stone Marles.

Marle of theſe kinds promotes vegetation in a ſurpriſing manner. It is probable, however, that it contains in itſelf few of the principles of which the vegetable food is compounded. Plants are not able to find their food in it. When in a bed below the ſurface, it reſiſts the entrance of water, like till or clay. When near the ſurface, and turned up by the plough in great quantities, the ſoil is little better than till, almoſt quite barren. The method of its operation will be beſt known by inquiring into its qualities.

It is obſerved, that both the clay and ſtone marles have the following qualities: When long expoſed to the air, or put into water, they fall down into a powder: they are very heavy bodies: the earth of which they are compounded, is of the abſorbent kind: they are attractors of acids; with them they raiſe a fermentation, and produce ſalts. The only difference betwixt them is this: the clay marle is ſooner diſſolved than the ſtone marle; and commonly has a ſtronger power of deſtroying acids, and producing ſalts. Dr Home ſays, that the clay marle, which he tried, deſtroyed a third more of acids than the ſtone marle.

Theſe marles ſeem to have much the ſame qualities with lime; and therefore, muſt operate in the ſame manner.

They communicate to the ſoil a power of attracting the vegetable food from the air; they enlarge the vegetable paſture; and they diſſolve the vegetable food that is in the ſoil, and prepare it for entering the roots of plants.

Theſe marles are long in diſſolving. Large pieces of the ſtone marle are ſeen ſometimes undiſſolved, ſix or ſeven years after it has been laid upon land. This makes it neceſ-

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ſary to apply a very large quantity of them, otherwiſe their effects will not be known.

As the quantity of marles applied is very great in proportion to the quantity of lime, land, when manured with marle, muſt have a ſtronger power of attracting the vegetable food from the air; and therefore the marle ſhould be preferred, when it can be as eaſily obtained.

As the earth of theſe marles is of the abſorbent kind; as a great quantity of it is applied at one time; and as it is long in diſſolving, it muſt be many years before its operation ceaſes; and if the land is barren, the nature of it will be changed, and ever after, by the ſame kind of dreſſings it received before, will continue to carry better crops. In this reſpect alſo it is preferable to lime. This advantage, however, depends, in a great meaſure, upon the nature of the ſoil. If the ſoil is ſoft and ſpungy, and has not a firm bottom, the marle, by its weight, will, by degrees, penetrate like lime beyond the reach of the plough; and therefore, muſt leave the ſoil no better than it found it.

It is this abſorbent quality of the earth of which marle is compounded, that probably renders the improvement by it laſting; and therefore, the marle that has this quality in the higheſt degree, may anſwer beſt in the end, though the effects of it are not ſo ſudden and violent. Chymiſts commonly try their experiments on marle taken from the pit: but if experiments were made on it, after it is diſſolved into powder, by the air, or mixed with earth, ſome of its qualities would perhaps be better known.

Although, in ſome reſpects, theſe marles ſeem preferable to lime, yet we are to conſider, that their principal operation is the ſame with that of lime; which is enlarging the paſture of plants, and fitting the vegetable food for entering their roots. When land, therefore, manured with them is exhauſted by crops, it cannot receive much benefit from them a ſecond time, if immediately applied. This is confirmed, it is ſaid, by ex-

perience. It is obſerved, that marle, when applied a ſecond time to land exhauſted by crops, has not the ſame effect as when firſt applied.

As marle operates in the ſame manner as lime, it follows likewiſe, that limed land, exhauſted by crops, can receive little benefit from the application of marle; and that marled land, exhauſted by crops, can receive little benefit from the application of lime. As it exhauſts the vegetable food, the proper manure after it is dung, which contains this food in the greateſt plenty.

As marle operates chiefly by attracting oils and acids from the air; the longer, therefore, that it lies upon land, expoſed to the influence of the air, the more quickly it will operate.

The difference betwixt the clay and ſtone marles was ſaid to conſiſt in this: That the clay marle diſſolves ſooner, and has a ſtronger power to deſtroy acids and produce ſalts. This kind is therefore preferable, as a leſs quantity will produce the ſame effects. If Dr Home's experiments are to be depended upon, or rather, if all clay and ſtone marles have the ſame powers with thoſe which he made his experiments with, then four cart-load of the clay marle is equal to five of the ſtone.

What was ſaid of lime, with reſpect to the application of it in ſmaller and larger quantites, may likewiſe be ſaid of marle. When barren land is to be improved, the marle ſhould be laid on in large quantities: but when land is in good order, the applying a fifth or ſixth part of the quantity commonly uſed, once in ſix or ſeven years, may have very good effects.

Of Shell Marle.

Shell marle is very different in its nature from the other two. It is commonly claſſed among the animal manures. It does not diſſolve with water, as the other marles do. It ſucks it up, and ſwells with it like a ſpunge: it is a much ſtronger attracter

attracter of acids than they; and contains oils, which it is uncertain if the other marles contain.

This marle, it would ſeem from the qualities it poſſeſſes, promotes vegetation in all the different ways. It encreaſes the food of plants by the oils which it contains, and the ſalts which it produces: by theſe ſalts, and by the abſorbent quality which it poſſeſſes, it communicates to the ſoil a power of attracting this food from the air: it enlarges the paſture of plants by ſwelling with water, and the fermentation which it occaſions; and it prepares the vegetable food for entering the roots of plants by the ſalts it produces in fermentation.

The difference betwix poor and rich ſoils conſiſts in the different powers of attraction. As this marle has ſo ſtrong an abſorbent quality, if applied in large quantities and frequently repeated, it is poſſible that it may communicate ſuch an attractive power to the ſoil as to enrich it in a very high degree; ſo as to need no further manuring, but by proper tillage may be made to attract from the air in the winter ſeaſon ſuch a quantity of vegetable food as is ſufficient to nouriſh a crop in ſummer.

As this kind of marle does not exhauſt land of its vegetable food, as the other marles, or as lime does, it may be applied to land exhauſted by them, or it may be repeated. As it diſſolves ſooner than the other marles, its effects will be more ſudden; and as it does not diſſolve ſo ſoon as dung, its effects will not be ſo ſoon over.

A late author ſuppoſes, that the marle found below moſs is compounded of earth and the alkaline ſalts of rotten wood. He explains in what manner he imagines it is formed. If there is a marle compounded of theſe ingredients, it is different from any of the marles that have been mentioned. However, it will operate much in the ſame manner. It will communicate a power to the ſoil of attracting the vegetable food from the air; it will enlarge the paſture of plants, and it will prepare the vegetable food for entering their roots.

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As it contains a large proportion of ſalt, its effects will be ſudden and violent. It is not proper therefore that a great quantity of it ſhould be applied.

As its effects are ſudden and violent, it cannot be expected that they will laſt long. It is probable that they will be ſoon over after it is entirely diſſolved.

The ſalts which it contains, will make it operate chiefly in diſſolving the vegetable food in the ſoil, and fitting it for entering the roots of plants. By this it will exhauſt the ſoil, if care is not taken to prevent it, by the application of dung, or turning the land from tillage into graſs for paſture.

There is another kind of marle that goes under the name of *ſhell marle*, and in ſome parts of the country, is found in great plenty. It ſeems to be almoſt wholly lime, and it operates in the ſame manner.

ARTICLE LXXI.

Of the different kinds of Manures for making Land fruitful, and Reflections on that part of Agriculture.

[In a letter to the Publiſher.]

COMMON farmers are generally, and too juſtly, blamed for want of thought: and every attempt to awaken their attention, and incite a ſpirit of enquiry and reaſoning among them, is commendable, and will be attended with advantage both to them and to the country. Your publication will greatly contribute to that end; and from what you have already exhibited, it appears, that it has already had ſome effect, by inciting the actual farmers to communicate ſome of their own experimental knowledge for the good of their brethren. I am not vain enough to think, that any part of my own knowledge is ſuperior to that of my brethren, or would contribute to inſtruct them: But the following thoughts on manures, from a Book of Foreign Eſſays publiſhed at London ſome years ago, may be

be of ſervice, not only in giving them ſome notion of the properties of different manures, but may likewiſe put them upon trials of ſeverals not before thought of. The eſſay, from which the following is taken, is ſaid to be the work of a perſon well ſkilled and experienced in Agriculture, and his obſervations founded upon the experience of ſeveral years, and conſequently deſerving more attention than vague and conjectural reaſoning.

The want of dung, and the impoſſibility of procuring ſuch a heavy commodity from a diſtance, are general complaints. There are few farms however, that have not within themſelves a fund for manure of ſome kind or other, that might be turned to advantage, in order to ſupply that defect. Where the practice of theſe is unknown, the farmer may juſtly be excuſed for not uſing them: But when they are pointed out, he will be glad of the diſcovery; and either want of thought, or want of activity and induſtry, muſt be in fault, if he does not uſe them.

Some of the manures mentioned in the eſſay, I have purpoſely omitted, as not being to be procured in this country: Thoſe which are worthy our attention are the following:

Duck and gooſe dung. This is deemed too hot and burning. The farmer is chagrined to ſee his graſs covered with gooſe dung; but if he would gather it in a heap, and mix it with the dung of large cattle, he would bring it to a temperate heat, and draw from it ſuch advantage as would indemnify him for the pains he ſhould take. The virtue of this method is known by experience: a farmer, having abandoned a piece of ground to his geeſe for the ſpace of twelve years, at the expiration of that term turned them out to let the graſs grow, and it roſe ſo thick and ſtrong that the ſcythe would ſcarce paſs through it.

Hen-dung. This is ſcattered like a ſort of ſpice in ſmall quantities upon land intended to be ſown; and on account of its heat it is never uſed unleſs when rain is foreſeen. It is an excellent manure for meadows.

Pigeon-

Pigeon-dung is much the ſame with that of poultry, the only difference being its ſuperior heat.

Human-ordure. The heat of this is beyond expreſſion, it being replete with an impure and burning ſulphur, that deſtroys every thing unleſs employed with great caution: this caution conſiſts in mixing it with ſtraw, or leaves, if they can be got conveniently from the wood; and in leaving it expoſed for a year or ſeveral months at leaſt to the open air and rain. It muſt be turned up from time to time that it may rot, its bad qualities be deſtroyed, and its heat moderated. If theſe meaſures are taken, it will be found as uſeful, as it is commonly thought dangerous.

Sheep-dung. This is of no long duration, even when taken from the cotts, and ſtill leſs durable when the ſheep are folded. In this laſt caſe, in order to prevent a too ſudden evaporation of the dung, the ground included in the fold ought to be covered with chopt ſtraw or foggage before the ſheep enter: but ſeveral farmers are diſguſted at this method of dunging their lands, becauſe of the difficulty of dunging them equally; a taſk that requires a very careful and faithful ſhepherd; and becauſe, in order to profit by this kind of dung, it ought to be immediately buried either with the ſpade or the plough.

The dung of horned cattle is the moſt refreſhing of all; and this well known quality points out what land it beſt agrees with. It is a wiſe precaution to make a ſink in the ſtalls, paved and lined with ſtone, in which all the juice of the dung may be preſerved, by which it may be preſerved and kept for uſe; being of great ſervice for watering gardens and graſs fields.

The dung of ſwine is not commonly eſteemed; yet when mixed with that of large cattle, it manures the ground as well as any other.

Horſe dung being naturally dry and warm, is much eſteemed: When rotted it is excellent for all the plants of the kitchen garden. To promote its rotting more eaſily, it ought to be aſſiſted with rain-water, ſoap-ſuds, and all the garbage of

of the kitchen, which fill it with ſalt and oil. It may likewiſe be mixed with cow-dung, which will temper its heat and dryneſs; and then it will become the beſt and moſt general of all manures.

Marle, by the confeſſion of all authors, is the moſt excellent manure. It is either white, black, grey, or yellow; ſometimes found under the firſt cruſt of the earth, and ſometimes taken from the depth of four or five fathom, for which purpoſe pits are dug in the places where it is expected to be found, though as yet there are no certain ſigns by which it can be diſcovered. Some authors obſerve, that it is always formed in marſhes that are dried and covered with earth, and that it is known by the bull-ruſhes that ſhoot up, and the ſhells that are found in the mole-hills of that ſort of ſoil. The moſt ordinary and beſt method for being aſſured, whether or not there is marle in any particular ſpot, is to ſound it with a long hollow wimble in which there is a rod, with a croſs handle at one end. When the wimble hath penetrated far enough into the earth, this rod is drawn out, and brings along with it marle from the bottom. Marle is not always ſolid, but ſometimes liquid and muddy, though the beds of it are always very thick. The marle being taken out of the earth, is laid in ſmall heaps upon the land, and afterwards ſpread like ordinary dung. It is ſo replete with virtue, as to fatten the earth for twelve, fifteen, twenty, nay ſometimes thirty years, during which it will require no other manure. But being very hot, and that in different degrees, the quality of it muſt be examined, and proportioned to the nature of the land on which it is to be ſpread. It is dangerous to lay it on too thick, for in that caſe it will burn; but whatever precautions are taken, a good crop is not to be expected from it the firſt year; yet the farmer is amply recompenſed for this tranſient barrenneſs, by the abundance that follows. It will be convenient to marle the land in the autumn or ſpring, that being diſſolved by the rains which

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are uſual in theſe ſeaſons, it may enter the earth ſo as to fertilize it, let it be never ſo barren.

Green turf, rotted or burnt. Wherever the farmer is not afraid to ſtrip the earth, as in old ditches, marſhes, &c. he carries away as much turf as he can take, lays it up in an heap, leaves it to rot for the ſpace of a year, and then ſpreads it upon the ground which he wants to fatten; it may alſo be uſed ſooner, if lime be mixed between the layers of it, for this will help to conſume it more quickly, and by impregnating the turf with its own virtue, of which we ſhall ſpeak in the ſequel, render it more fit to fertilize the ground. As to burnt turf, we ſhall relate in what manner an expert and induſtrious farmer conducted himſelf in the operation: He ordered a barren meadow, and at another time a piece of ground, to be ſlightly laboured in the ſpring, and ſo leaving them that whole year and the following, till the beginning of Auguſt, that they might have time to rot and dry, he gave directions for paring off the turf in pieces two feet ſquare; of theſe he built ovens reſembling thoſe that are uſed by bakers, with a ſide-opening below, to the windward; through this opening a very dry faggot being thruſt into the oven was ſet on fire, and when well kindled, the oven entirely ſhut up with turf, and the fire preſerved within. The people employed to watch over theſe ovens, took care to lay new turf in every place where the fire penetrated and became viſible. This operation laſted ſeveral days and nights, until at length the ovens were reduced to heaps of aſhes, which were ſtrewed pretty thick in a field that was on the eve of being ſown. It produced the faireſt and the beſt of crops, and the ground, though before but indifferent, was conſiderably meliorated by this expedient. As for the places from whence the turf had been taken, which remained bare, they were covered with the remains of the turf which had not been burnt, together with earth ſcraped from the ſpot where the ovens had been; then being plowed and ſown with oats in the ſpring, they were in condition to produce graſs as formerly

formerly. Thoſe who can find turf, without being obliged to ſkin their meadows, will ſtill ſurpaſs this farmer in point of advantage.

Peaſe, beans, lupins, vetches, and buck-wheat. Nothing is more uſeful in fattening the ground, than to ſow theſe ſorts of grain, and before they come to maturity cut them down, till, and overturn them in the earth, without minding the ſmall profit that might be expected from the crop, in caſe they are left to ripen; for as theſe kinds of pulſe very much exhauſt the earth, it is eaſy to comprehend, that the nouriſhing juices are more abundant and perfect in the fruit than in the ſtalks and leaves; and that if the fruit is carried away, we cannot, by overturning the reſt, reſtore to the earth all that ſhe has given. We ought not, therefore, to diminiſh in any ſhape the produce of the ground, nor even ſtay until the fruits are ripe, in order to bury them; becauſe then the ſtalks have loſt a certain vigour and volatile ſpirit, which on account of their activity ought to be preſerved and ſhut up in the earth, where being retained, they are rendered more fit to fructify the ſeed which ſhall be afterwards ſown: beſides we ought to conſider, that what is ſuppoſed to be loſt, in omitting to gather the fruits, will be retrieved by the ſaving of dung, which will not be wanted for the land, as well as of carriage and workmen to ſpread it. Nevertheleſs, for a ſupply of grain we may reſerve a piece of ground to be dunged as uſual, on which pulſe may be left to ripen for a crop. This kind of fattening is moſt proper for high grounds, to which it would be troubleſome and expenſive to carry dung.

Pond mud. Under this name we underſtand not only the mud of ponds, but likewiſe the ſlime that rivers depoſite when they retire, after having overflowed their banks, and that which gathers on the declivity or at the foot of high places, in pits that are either natural, or prepared by the induſtrious farmer. This ſoil is excellent, becauſe it is new. It muſt not, however, be employed immediately, eſpecially the mud of

ponds, becauſe being extremely moiſt it would chill the earth, and produce an effect quite contrary to the farmer's expectation: it muſt therefore be left unemployed one year at leaſt, unleſs it has been qualified with a mixture of chalk; but care muſt be taken not to let it lie unuſed for four or five years, during which it would loſe all its virtue, by the evaporation of thoſe light fine ſalts with which it was impregnated by the water, and nothing but dead earth remain. It ought likewiſe to be obſerved, that the mud of ponds, being left to dry, preſents a ſurface mixed with ſand, and a kind of dead clay, which is good for nothing; but this firſt layer being removed, that which we ſpeak of will be found below. This kind of manure being warmed and rotted, muſt be ſpread equally and pretty thick upon the land, and turned under ground, as ſoon as poſſible, leſt the weather cauſing its light oily parts to evaporate, the vegetative virtue of it ſhould be enfeebled,

Aſhes. Under this head we mean to ſpeak only of the wood-aſhes taken from chimneys, forges, and ovens, and thoſe of coal, earth and turf. Theſe aſhes are particularly excellent for peaſe, vetches and other ſuch pulſe; and are ſpread immediately before ſowing the grain. They are alſo ſometimes ſcattered or ſown when the plant hath riſen about an inch from the ſurface of the earth; but as their ſalt being very ſharp, would in dry weather infallibly prejudice the tender vegetables, they are not uſed until the farmer can depend upon immediate rain to diſſolve and ſoften their acrimony.

Soap-water and ſoap-aſhes. Theſe, according to ſome farmers, are the moſt precious of all ſorts of manure; eſpecially ſoap-ſuds, to which may be joined lye-water. What conſtitutes the great virtue of this manure is, that beſides the vegetable ſalts and oils, that enter the compoſition of ſoap, it likewiſe contains the ſalts and oils of the animal reign, that reſided in the linen, which it cleaned and whitened; and theſe laſt perfectly ſoften the acrimony of the firſt. This water ought to be carefully reſerved for gardens, where it will produce admi-

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rable effects. As for the aſhes taken from ſoap houſes, they ought to be kept dry, and never carried to the ground until it is on the point of being ſown; then it is ſpread as equally as poſſible with ſhovels; and care may be taken to lay it on pretty thick, experience having ſhewn that the ground is bettered by it for eight or nine years, during which it will need no other dung. If there is not a ſufficient quantity of aſhes, dung may be added to them; but in that caſe, they are not ſo effectual, as may be eaſily imagined.

Shells. Some ſpots of earth are filled with ſhells which are for the moſt part brittle, and crumble into white powder, which is an excellent manure, and ſome authors pretend that it renders land fruitful for thirty years. Theſe ſhells are not neglected in Touraine, and the expert farmer who finds ſuch a mine, will not fail to make his advantage of it.

Lime. The property of lime ſpread upon the ground is to deſtroy noxious weeds, drive away inſects, fertilize the earth and keep it clean. The ſeaſon for uſing it is, when the land is ready to receive the ſeed: for which the reaſon is, that by ſpreading the lime and labouring afterwards, the lime would be turned under ground; and its virtue ſtill deſcending by its weight and the rains, it would no longer act upon the ſurface, which will therefore continue to be covered with noxious weeds and inſects, though the intention was to clean and meliorate this very ſurface: wherefore it is evident, the ground ought to be entirely laboured before the lime be applied, that we may be aſſured it may remain with the ſurface, and there produce the good effects we have reaſon to expect from its qualities. If the farmer in the firſt year, after having prepared his grounds in this manner, does not reap ſuch an abundant harveſt, as he had reaſon to expect, he ought not to loſe his patience; the ſecond year will pay with intereſt what the firſt could not afford.

Blood. It is not a little ſurpriſing that people ſhould ſo much neglect this, which is one of the principal ſpecies of manure.

manure. The nature of blood, which is replete with ſalts, oils, and ſpirits, ought to have convinced the farmer how proper it was to fertilize the earth. Every judicious farmer will therefore take care not to loſe one ſingle drop of that which is taken from his beaſts: and even furniſh himſelf with as much as he can procure from the ſhambles, fully perſuaded that this ſmall trouble will requite him an hundred fold, by the fruitfulneſs of the land upon which it is ſpread.

The dirt of ſtreets. The goodneſs of this manure conſiſts in its being fat, well brayed, and mixed with abundance of animal dung and ſweepings thrown from houſes, abounding with things that have the virtue of dung. It ought not however to be uſed, until ſome time after it hath been collected, when it is thouroughly rotten; and in order to accelerate its preparation, it ought to be ſtirred from time to time.

Soot contains a very volatile ſalt, and agrees beſt with onions. It is an excellent manure for a ſpring dreſſing to wheat, and for graſs grounds, of which it encreaſes the crop of hay greatly, and is ſaid to kill the moſs.

Salt-Petre or Nitre and common Salt. We might amply expatiate on theſe two articles, but ſhall reſtrict ourſelves to a few words, only obſerving that Nitre and Salt are the moſt efficacious principles of vegetation; and that in them principally conſiſts the virtue of all the dung that is uſed: wherefore all matter impregnated with them is proper for fertilizing the earth.

Scraped earth, or what is collected in yards when they are cleaned after rain. It is laid in heaps, and left ſometime to rot; then being carried to the leaneſt land, it is ſpread, and in tilling put under ground: and this manure is ſo vigorous as to fatten the earth for ſeveral years.

Plaiſter and rubbiſh of old houſes. This matter is often thrown away as abſolutely uſeleſs, into places where it can turn to no account. Nevertheleſs a prudent farmer will obſerve, that after the bricks, tiles, and ſtones are picked out, what remains

mains will be uſeful, as it is a mixture of lime and clay, which hath received the impreſſions of the air, and the exhalations of the earth during a long ſeries of years; without reckoning the wood, ſtraw, and other rotten materials, which are always found in ſuch places. In thoſe countries where the earth is impregnated with ſalt-petre, as at Touraine, the very ſtones partake of it; ſo likewiſe, where plaiſter is common, we ſee it turning into ſalt-petre in the lower parts of the houſes; and we may therefore conclude it may be made uſe of to great advantage in enriching land.

Burnt ſtubble. The manner of burning ſtubble has been at all times univerſally known, as the certain means of deſtroying weeds and inſects; but it is not without danger. For, if we do not take particular care, in obſerving from what corner the wind blows, we run the riſk of damaging the fruit trees and woods in the neighbourhood. In thoſe countries where the graſs grows ſo thick that the ſheep cannot conſume the whole of it, about the end of autumn, they ſet fire to the dry graſs, that the new may have room to ſprout up in the ſpring; and this is the great reaſon of the aſtoniſhing fertility of thoſe diſtricts. But, in regard to the ſtubble, we ought to add, that divers farmers chooſe rather to turn it under ground with the plough, than to burn it; pretending that by rotting it renders the land more light and fruitful.

Putrefied animals. Every body knows what benefit trees receive from animals that are buried at their roots. This is an approved remedy for their diſtempers and barrenneſs: and a certain farmer has propoſed this queſtion on the ſubject: Whether, in the mortality of cattle, it would not be proper to make a deep trench, in which all the beaſts that die of the diſtemper being thrown, ſhould be covered with leaves or ſtraw, if it was in plenty, and over that, with part of the earth dug out of the pit, to the depth of two or three feet; upon which ſhould be laid briars, faggots, and other things, to hinder the animals from digging? The carcaſſes ſhould be left,

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in this manner, to putrefy during ſeveral years, at the end of which the trench ſhould be opened, and the earth to which the bodies are reduced, taken out for manure to the ground. This farmer does not believe, that the leaſt veſtige of the contagion that deſtroyed the cattle could ſubſiſt in the matter to which they are reduced, or even in the earth; and imagines that, in order to be abſolutely ſecured againſt every troubleſome conſequence, it would be ſufficient to mix that earth with a little lime. At leaſt, by theſe means a great calamity would be productive of ſome little advantage.

All putrefied ſubſtances. Putrefaction is the operation by which nature diſſolves one body for the formation of another; it is therefore eaſy to conceive, that every thing which is putrefied muſt favour vegetation; and it is unneceſſary to inſiſt further upon the ſubject.

Urine is full of ſalt and ſpirit; but they are ſo ſtrong and ſharp, that they burn every thing when the urine is employed by itſelf; it is therefore convenient to mix and ſoften it with rain water, and then it becomes an excellent manure.

Currier-lye, &c. To this lye muſt be added all that comes from tan-works, fulling-mills, dyers vats, and manufacturers of wool, as well as all the waſte in dreſſing hides, hair and horns of animals, and leather works. All that belong to the animal reign is precious in itſelf, on account of the ſalts with which it abounds; and theſe good qualities are augmented by the oil and fat uſed in preparing the greateſt part of it, or in keeping the leather in repair. That old leather, therefore, which is uſually thrown away, ought to be carefully preſerved; and whether ſcattered upon the land, after having been cut in ſmall pieces, or ſteeped and rotted in all ſorts of greeſy and dirty water, ſuch as diſh-waſhings, ſoap-ſuds, &c. kept for enriching the ground, the wonderful effects of it will ſoon appear.

Potters earth is uſually employed on ſandy grounds, and ſuch as retain no water: it binds the earth, and enables it to bear.

Pit

Pit coal being replete with ſulphur and oil, ſea-ſand, and ſea-weed, which abound with ſalts, and all ſorts of ſaline and oily matter in general, always form an advantageous manure; for theſe ſalts and oils conſtitute all that is uſeful in the ordinary kinds of dung.

It is no ſmall queſtion in agriculture, to determine, where and in what manner the different kinds of dung ought to be collected, until they are carried into the field; for, upon their virtue depends the fertility of the earth. If the dung is not ſufficiently rotted, it cannot fatten the earth, in which it will remain ſeveral years, without being conſumed; if it is too much rotted, it will not encreaſe the crop, and generally loſes the greateſt part of its ſtrength. It rotts pretty well in the ditches, where it is commonly heaped together; but is apt to turn ſour, and then can be of no ſervice. The beſt method, therefore, ſeems to be, to place it on a gentle declivity, that the rain water may run off without ſouring it; and to make the dunghill higher than it is broad, that the ſame rain which waſhes and ſcours the ſurface, may not damage it too much. It will be very uſeful to dig ſinks below, and at ſome diſtance from the dunghills, in order to retain the juice, which is precious to every prudent farmer, either for ſteeping his ſeeds before they are ſown, for it is replete with oil and ſalt, for watering his garden, or macerating different kinds of manure, ſuch as leaves, old leather, parings of cloath, &c. or, finally, for facilitating the putrefaction of horſe dung, which is, as we have formerly obſerved, very dry in its own nature.

The dunghill being thus diſpoſed, care muſt be taken to hinder ducks from approaching it; for, with their large bills, they ſuck a conſiderable quantity of the fat from the dung, and make holes through which it runs, as the dunghill ſinks in rotting. We muſt likewiſe be cautious of loading an old heap with new dung, the weight of which will too much compreſs and ſqueeze out the ſubſtance of the old.

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It is neceſſary to make ſeparate heaps of each kind of dung; and likewiſe advantageous to mix them all together, that their different qualities being confounded, may produce a general manure, which may be every where uſed with ſucceſs: but it is difficult, not to ſay impoſſible, to lay down preciſe rules on this ſubject; the farmer's own diſcretion will prompt him to examine whether or not he has occaſion for any particular dung; and the nature of his grounds, with which he will ſtudy to make himſelf acquainted, will furniſh him with certain rules for his conduct in this article.

There are ſo few countries in which the land needs no manure, that in paſſing over theſe happy regions in ſilence, we do no injury to the rules of agriculture. We ſhall then obſerve in general, that all ground is either cold and moiſt, or hot and dry: upon this ſimple principle, reaſon will induce us to carry hot dung to cold lands, and cooling manure to hot ground; but as there are different degrees of heat and dryneſs, and cold and humidity, it will be neceſſary to proportion the dung to the quality of the ground; and this is done by mixing together thoſe different ſpecies which are moſt agreeable to the ſoil. This caſe is a ſubject of great reflection to the farmer; for, beſides that he cannot exactly know the quality of the ground, but by dint of long experience, he muſt not flatter himſelf that it will remain always the ſame. A rivulet that uſed to run under a field, chancing to change its courſe to the other ſide, is ſufficient to alter that field from moiſt and cool to hot and dry. We mention this example from a thouſand others of the ſame kind, which we might cite, to convince every man who cultivates his land, that he ought to be continually attentive to the methods he takes with it, if he would reap the fruits he ought to expect from his labour.

As the ſame grain is not always ſown, ſo neither ought the ſame dung to be uſed upon the ſame ground. This method is founded upon a natural philoſophy, of which it is not eaſy to give a diſtinct idea. We know, that the earth and dung

dung are full of ſalts and oils, or fat, of different kinds, and a mixture abſolutely impenetrable to the human underſtanding. But reaſon and experience teach us, that they do not all equally concur in the production of fruits. While ſome are in agitation, and exhauſt themſelves, others remain in inaction and are accumulated; for which reaſon the earth ought to be ſowed with a different kind of ſeed, which, leaving the weakened ſalts at reſt, attract theſe which they find in vigour and abundance. On the other hand, the earth being too often covered with the ſame dung, is cloyed with a kind of ſalt and oil that predominates in that manure, ſo as not to be able to attract and incorporate them with her own: it cannot therefore but be very advantageous, to furniſh her with a new kind, for her accommodation. For it may be eaſily conceived, that in dunged land, the ſalts and fat of the manure do not act ſeparately from thoſe of the earth, but many unite and incorporate together, by the heat of the earth and ſun, and the action of the air, which, penetrating every where, diffuſe through the whole maſs a certain fire and humidity which conſtitute the ſoul of nature.

To the knowledge of the different kinds of dung that agree with different pieces of land, is joined the care of preparing them for the time at which they will be wanted: experience will teach the farmer how long they ought to lie in the ſtall, and afterwards in the air, for their being brought to perfection. When he is afraid that there is not time enough before him, inſtead of making litter of long ſtraw, he will cauſe it to be cut, by which means it will rot the more eaſily.

The dung being carried into the field, is laid in ſmall heaps at a certain diſtance from one another, before it is ſpread; and the ſpots where theſe heaps have been are eaſily known, in the ſequel, by the beauty and abundance of corn they produce. It is therefore a very prudent method of fertilizing the ground more equally, to multiply the number of heaps, and leave but four or five paces of diſtance between them.

The farmer would be very much deceived, and expoſe himſelf to conſiderable loſs, if, in multiplying, as we have ſaid, the heaps of dung, he ſhould lay on more than the land requires: the corn indeed would ſpring up with great force, but the ears in forming would ſtarve one another; the ſtraw would be weak; the grain ſmall; the wind and rain would eaſily lay them, and they would not be able to riſe without great difficulty. The multiplication of heaps then of which we ſpeak, ſolely conſiſts in making them ſmaller than uſual, that they may be nearer to each other.

If it be dangerous to dung a field too much, it is not more ſafe to manure it too little; therefore when there is a ſcarcity of dung, which is a great misfortune, it is better to ſow no more than a part of the land, which can be ſuitably manured, than to loſe the ſeed upon that which can have none, or to dung the whole ſo ſuperficially that the harveſt will ſcarce defray the expence of cultivation. However, as the loſs is viſible, and attended with great conſequences for the following years, the farmer will in due time take proper meaſures for having a ſufficient quantity of dung, or ſeek for reſources to ſupply the want of it in thoſe fatteners which we have mentioned. We flatter ourſelves with having given a detail of a ſufficient number, ſo as that he may uſe ſome of them to advantage; and we are not without hope, that, compelled by neceſſity to have recourſe to ſuch expedients, he will hereafter eagerly execute at large what formerly he may have thought himſelf happy to have tried in little.

The only reaſon for laying dung in ſmall heaps is, that it may be ſcattered more eaſily and equally; and this, though one of the leaſt agreeable works of huſbandry, is nevertheleſs that which in a more eſpecial manner demands the eye of the maſter, and that too of a liberal maſter; for a farmer who is niggardly, either in the wages of his workmen, or in the gratification of his domeſtics, will never ſee his dung ſpread as it ought to be. In effect, it is not enough to ſcatter it with the

the ſhovel and rake, for it often ſticks together in clots, which ought to be taken up and tore aſunder with the hands; an operation which no labourer will perform, unleſs through a ſpirit of fidelity ſo rare as not much to be depended upon, or from the hope of recompence, or in conſequence of a reaſonable ſalary. However, if the dung is not thus diſtributed, it will not rott in the earth, conſequently cannot turn to account.

As the nature of the ground determines the time when the dung ought to be laid on, ſo the nature of the dung preſcribes the time and manner of putting it under ground. Cold land requires hot dung, which ought to be laid on early, and quickly buried by overturning the earth upon it, leſt it ſhould evaporate; for the moiſture of the earth is ſufficient to finiſh the rotting. To hot and dry lands we apply fat dung, in which we run no riſk, by carrying it out late, and leaving it ſome time on the land when it is ſpread, before it is covered. The ſun, by beating upon it, facilitates the putrefaction; it attracts from the air a ſalt and nitre, by which its virtue is augmented; and it will be ſufficient to till when we want to put it under ground. But, in general, whatever dung is uſed, or whatever the time may be at which it is covered, we muſt take care that it is not buried too deep. It is in the ſurface of the earth that the corn takes root, and there it ought to meet with the aſſiſtance of the dung which is prepared for it.

When the dung is covered, an harrow muſt be drawn over, in order to ſmooth the field; and ſometimes, when the manure conſiſts of long ſtraw, it is caught by the teeth of the harrow, and dragged along; ſo that what was diſperſed, is again left in heaps; in which caſe, ſome parts of the grounds are too lean, while others are too fat; when this therefore happens, we ought carefully to take up the harrow and diſengage it from the ſtraw, that the dung may remain in its proper place.

What

What we have ſaid of dung, may be applied to ſeveral kinds of thoſe fatteners which we have mentioned; but it will be neceſſary to obſerve, that when aſhes are ſcattered upon the land, there is no occaſion to put them under ground: In remaining expoſed to the air, the rain diſſolves their ſalts, which enter into the ſurface of the earth, and there produce that fertility which we propoſe to give her.

All thoſe fatteners cannot be prepared in the ſame quantity; and we are not ignorant, that many people reject with diſdain what cannot be collected at a ſmall expence, and employed in great quantity: but without examining whether this way of thinking does not proceed from a fund of lazineſs, we will obſerve, for the benefit of thoſe who have but ſmall means, without a number of cattle neceſſary to produce a ſufficient quantity of dung, that, in taking advantage of, and reflecting carefully on what we have ſaid on the different articles of this eſſay, they will infallibly, and ſometimes without expence, find means, not only to fertilize their gardens without employing their dung, which may be wholly reſerved for their plowed grounds, but alſo increaſe the ſtrength and quantity of that manure. The narrow bounds of their poſſeſſions, inſtead of diſcouraging, ought to animate them to beſtow good culture upon the ground: they ought to conſider, that people in the midſt of wealth are impoveriſhed by negligence, while the pooreſt are enriched by induſtry and toil. When the Roman Republic eſtabliſhed a colony, it aſſigned no more than four acres of land to each ſettler; this moderate portion of ground being deemed by the antients ſufficient to maintain a family; doubtleſs, on the ſuppoſition that it was cultivated by the maſter himſelf, with all poſſible care and attention.

ATRI-

ARTICLE LXXII.

A Letter to the Weſt Country Farmers, concerning the Difficulties and Management of a bad Harveſt. Continued from N°. X. p. 503.

OF HUTTING CORNS.

THE third method of ſetting up corns in order to preſerve them, is hutting. Though a wiſe man will prefer a well made ſtook, to every other way of preſerving or winning corn in the fields, yet hutting is ſometimes neceſſary, before particular kinds can be fitted for the barn or yard. It is therefore uſed in light grounds, hot gravels, or thin ſoils near the rock; where the ſtraw is ſmall, and the bottoms of the ſheaves are full of weeds, or natural graſs.

A hut of corn is a ſmall clump or ſtack, reſembling a hay quoil or rick; and conſiſts of about forty, fifty, or more ſheaves, according to the nature and ſtate of the victual at the time. The deſign of it is to preſerve the corn upon the top of the ſheaf from future damage, after it is pretty well dried in the ſtook, or gayt ſheaf; and to expoſe to the air the wet and graſſy bottoms, that cannot be ſo well cured and win, while they ſtand upon the damp earth. It is therefore peculiarly neceſſary to certain corns and ſoils; eſpecially in calm and dropping ſeaſons. From this general intention of hutting, it is eaſy to ſee, that the operation cannot be ſo well performed immediately after the corn is reaped, or when the crops of the ſheaves are wet. If this was done, unleſs the quantity put together was very ſmall, it would probably heat too much in the hut, and ſpoil both the colour and quality of the grain.

Further, from the ſize and figure of a hut, as well as the intention of it, it muſt alſo be obvious to a man of ſenſe, in what

what manner it ought to be built; and equally eaſy to him to detect any errors in the common practice, that may be committed through ignorance or inattention. But paſſing all obſervations upon an erroneous practice, we ſhall, *1ſt*, in as few words as poſſible, give the moſt approved practice in common uſe. Then, *2dly*, we ſhall give a ſmall improvement on it, which may be of advantage, in caſe a bad ſeaſon ſhould force the farmer to hut his corns before they are ſufficiently dried, or deadened for that operation.

And firſt, of the moſt approved method of hutting, in common uſe. You will obſerve, that as huts are generally made of the ſtooks, or gayt ſheaves, which have ſtood ſome time, the farmer chuſes, from thoſe around him, a ſufficient number of dry ſheaves, of the cleaneſt and ſtrongeſt ſtraw, for the foundation of his hut. Theſe he ſets up like the ſtale of a ſtack, in a circular form, but not preſſing it too cloſs together; and about it he ſclates on ſome of a leſſer ſize, that do not reach the ground. His care is, by this ſecond courſe, to cover all round the open ſpaces in the ſtale below it. This brings the top of the work to its full breadth, and nearly to a level. Upon this again he begins another courſe, firſt by filling the heart well with his dry hoodings, and other ſheaves, choſen from the windy and dryeſt end of his ſtooks; and then he takes the wetter and more graſſy bottomed ſheaves, to be ſclated upon the outſide as before. After theſe are put on properly, that is, by ſpreading their bottoms a little, and thereby covering, as directed above, all the open ſpaces between ſheaf and ſheaf in the courſe below them, he again ſets up a few hoodings, or ſuch like in the center, as many as he thinks neceſſary to contract the circle towards the top; and having choſen ſome of his greeneſt and wetteſt ſheaves, he again ſclates them on, both around and above the other, till he brings the whole to a proper point, or top. Here he does not care how wet or green his ſheaves be, becauſe he truſts to their height, and outſide ſituation, for their drying: and

is not even diſpleaſed, that they have ſome more than ordinary weight in them, to reſiſt the wind, that they may not ſo readily be blown off till the whole ſits together a little, or can be ſufficiently faſtened together. For this laſt purpoſe, and as a further covering to the whole, the farmer looks about him for one of the largeſt and greeneſt ſheaves in the field, for a top ſheaf; and if he is not properly fitted with one, he tyes two ſheaves together in one ſtrap, pretty near the crop. This he fits on above all, ſpreading its bottom round the whole, and as far downward as it will reach. If the weather is windy, two thumb ropes of ſtraw are put on acroſs each other, round the neck of the top ſheaf, and faſtened below at each end. This finiſhes the hut, and will ſecure it againſt all weather for a conſiderable time. For by ſclating on all the outſide ſheaves, with their heads ſufficiently raiſed, the rain that falls drains off, as from a thatched roof; and by ſpreading their bottoms rightly, ſo as to cover all vacant ſpaces between ſheaf and ſheaf, none of it gets admittance to the body of the hut.

In very bad weather, when the farmer cannot find a ſufficient number of dry and deadened ſheaves, for the ſtale of his huts, an ingenious neighbour begins his operations in the following manner. He chooſes ſheaves of the cleaneſt and ſtrongeſt ſtraw; and with theſe he ſets up two ſtooks, croſſing each other in the middle, and extending ſo far on all ſides, as he deſigns the wideneſs of his hut ſhould be. And having put them up in the beſt manner directed on the article of ſtooking, they give him four logies or funnels pointed to four quarters of the heavens; ſo that blow the wind how it will, it paſſeth freely from ſide to ſide of the hut ſtale, and communicates its influence to the inſides of all the ſheaves in the croſs ſtooks. The quarters between their ends he fills up but ſlightly, by a ſingle large ſheaf or ſo; that the air having ſufficient room here alſo, may communicate its influence to the outſides of the croſs ſtook ſheaves. This is excellent

lent. But it is eaſy to ſee, that ſuch a foundation will not bear a great quantity of ſtuff above it; neither does the condition in which we ſuppoſed it to be, admit of one's putting too much of it together. The farmer therefore, obſerving the rules of hutting, above preſcribed, by ſetting his beſt dried hoodings and other ſheaves in the middle, and by ſclating on his wet and graſſy bottomed on the outſide of them, he quickly brings it to a top; which he finiſhes off as neat and cloſe as he can, to prevent the entry of rain into the heart of the hut. A hut put up in this faſhion, by an exact hand, while it preſerves the ſtuff from danger, will alſo win it, in half the time that would be required for a large quantity put up in the common faſhion; and it will give it out in better condition to the carrs and waggons, when it is to be carried off the field.

But if corns are put up in tolerable good caſe either of the ways, they will ſtand a long time in ſafety, and with the common intervals of fair weather, or of windy weather though ſcarcely fair, they will improve conſiderably, and be got in at laſt in very good condition. The farmer therefore acquires a kind of temporary eaſe, and ſecurity of mind, when his fields that require hutting are put up in good condition, and with a proper care and accuracy in the workmanſhip.

Upon the whole of what hath been ſaid, on this ſecond period of harveſt-work, it may be obſerved, that whether corn are gayted, ſtooked, or hutted, the farmer's ſecurity in all ſeaſons, depends, *1ſt*, upon his having ſome knowledge of the beſt methods of performing his work, and his thinking a little of what he is about. *2dly*, Upon a ſufficient pains and accuracy in the execution of it. And if he begins with right methods, he ſhall ſoon acquire a facility and exactneſs in every manual operation. It will at laſt become a habit, or ſecond nature to him. To encourage him therefore, to take the neceſſary care and pains, I could aſſure him of his ſaving more than half of what is commonly loſt, or ſpoiled by a bad har-

veſt

veſt. For, in following the very cuſtoms that are in common uſe, even that is the difference, I may ſay, between a prudent and a thoughtleſs, an active and a ſlothful management. If the farmer thinks otherwiſe, and indulges himſelf in careleſſneſs, or diſſipation, he muſt content himſelf with being bankrupt, before half his tack is run; or if, by a fortunate ſituation, he ſees it out, he muſt reſolve to ſatisfy himſelf with being a great deal poorer at the end of it, than otherwiſe he might have been. I know what is commonly thought and ſaid by many of you, when your neighbour grows rich and you poor, or when he ſucceeds in any operation which miſgave in your hands. You never imagine him more ſkilful and careful than you; you don't blame yourſelves for ignorance or negligence: No. Theſe things ſeldom enter into your thoughts; you ſay, he is always lucky; every thing goes well with him: I am for ever unfortunate; nothing ſucceeds with me, deſign what I will. Both in your religious and worldly concerns, many of you think, or ſeem to think, that heaven has taken the whole of them upon itſelf; and appear as afraid of interfering with it. So much do you depend, or ſeem to depend, on its grace, that you ſcarce attempt to do what it expects and requires of you. Theſe are often the pretences and excuſes of ſloth. For, though the race is not always to the ſwift, nor the battle to the ſtrong; neither bread always to the wiſe, nor favour to men of underſtanding: yet, in the general courſe of things, a good fortune, or rather, the grace and providence of heaven, commonly attend the footſteps of Wiſdom and Induſtry.

With reſpect to the peaſe and bean crops, they are ſeldom covered; nor can they be well employed, in ſtook or hut, as coverings to themſelves. And therefore, if coverings are to be put upon them, it would be beſt to protect them with oat ſheaves, or thatch ſtraw. The common practice however is, after they are bound, to ſet them up in the way of ſtook, ſix or eight ſheaves together, without any covering at all. If this naked method is approved, it would appear to me better

to put only four ſheaves together; then, all of them would be alike expoſed to the air and drought; and all alike ready, when they were to be carried off the field. If one would wiſh to have them covered when they are near dry, then ten or twelve ſheaves may be ſet together in the way of ſtook, and covered with four or five riders and hoodings of green corn if at hand. But, unleſs the peaſe or beans be full of graſs and weeds, I ſhould not be fond of moving them from their ſeats, nor even of laying them down, till the day, or the day before, I hoped to take them home. The reaſon is, that, after they have ſtood long under alternate rain and drought, the leaſt motion makes them open their pods, and ſhakes out their grain. The practice however, of laying down corns of all kinds, to air their bottoms before they are carried in, is generally uſeful, and ſometimes neceſſary; eſpecially when they have ſtood long upon a wettiſh ſoil, and under wet weather. But our rules and obſervations upon the management of this part of the harveſt-work, we refer to the next period of it.

Of ingathering and ſecuring the Crop.

The third period of harveſt-work comprehends every operation that may be neceſſary, from the time that the corns appear to be ready for ingathering, till the whole is finiſhed, and the victual, put into the barn or barn-yard, is brought into a ſtate of perfect ſoundneſs for uſe, and of perfect ſafety for preſervation.

Here then let me obſerve, that notwithſtanding the beſt intentions of the farmer, to have his corns in good condition for being carried off the field,—to put them into ſtack or barn in good keeping order,—and to ſecure them effectually againſt all future dangers; notwithſtanding he has uſed his utmoſt care and diligence, to anſwer his good intentions in all theſe particulars; yet by ſome change of weather, ſome hurry in his operations, ſome inattention or neglect, ſoon or late, errors are committed, and neceſſaries unprovided, ſo that the honeſt man

man ſuffers in one or other particular, and meets an unexpected diſappointment. Therefore, that we may overlook nothing material to his ſecurity, which he himſelf may forget, we ſhall divide the buſineſs of ingathering, and ſecuring his crops, into the following heads.

1*ſt*, Of the operations immediately preparatory for leading corns.

2*dly*, Of the operations preparatory for ſtacking and mowing corns.

3*dly*, Of the methods of building, covering, and roping ſtacks; and the proviſions neceſſary for theſe operations.

4*thly*, Of the means uſed for recovering heated corns, either in mow or ſtack; and the proviſion that may be made for rendering this an eaſy work.

In all theſe we proceed upon the ſuppoſition of unfavourable weather; and at the ſame time, that ſome room is left for human prudence and activity. And we ſhall be as particular on the whole, as is neceſſary to be underſtood and believed by any farmer of common thought and reflection.

1ſt, Of the operations immediately preparatory for leading corns.

In entering upon this point, it is neceſſary to obſerve, that the farmer ought never to begin his leading upon mere conjecture that his corn is ready. He himſelf ſhould examine it, in all its different parts and poſitions. It was not perhaps all cut in one day, nor in the ſame condition of dryneſs or ripeneſs; nor laſtly, was it all alike expoſed to the influence of the drought. He ſhould therefore examine it ſtrictly with his own hands and eyes, leſt after he has diſengaged his ſervants from other occupations, and yoked his cattle, he be diſconcerted, and obliged either to proceed with danger, or to leave off with ſhame and loſs of time. It were better this trial were made the day before, than on the day of ingathering; that he may have time to be well concerted, or even to remedy what he may find amiſs. On this occaſion, a few of the worſt

ſheaves

ſheaves may be marked where they ſtand, and a few others laid out to dry; that by inſpecting ſuch at ſome hours diſtance, he may be able to judge of the whole field at preſent; and even to underſtand what time it might require, to mend the worſt of it. And if he viſited the field in the ſame evening, or in the morning of the next day, with the ſame care, he could not fail of being concerted and prepared for the beſt.

If, upon his firſt trial, the farmer finds his corns in good order, and the ground itſelf perfectly dry beneath his ſtooks; he has no more to do, but to order his men and horſes to be got ready, at an appointed time, that his work may go on briſkly.

If he finds no faults, but a little dampneſs in the bottoms, ariſing from their long ſtanding upon a wettiſh ſoil; and that the whole might be better of an hour's drought, all hands may be called together, in order to lay it out, that no time may be be loſt. In this operation, the hoodings are firſt pulled off, and ſet at the end of the ſtook, not directly in the wind; then the operator takes hold, with both his hands, of the crops of the eight ſtanding ſheaves, and pulling them towards himſelf, he wheels them about to the ſun or wind in one piece, as he lays the whole down upon its ſide. If the two ſides of the ſtook are unequally dried—For example, if the winds have blown for two or three days from one quarter, or the ſouth ſide has enjoyed a warm ſun, or the dew is yet hanging on the north ſide; in that caſe, it is beſt to turn the damp ſide uppermoſt: for which purpoſe nothing more is requiſite, but that the operator ſtand upon the drieſt ſide, while he pulls the ſtook towards him, and wheels its bottoms to the ſun or wind: for in laying the whole down, the drieſt ſide will be always lowermoſt, the wetteſt ſide always uppermoſt. And it might not be amiſs, before he parts with it, if he drew his hand acroſs the bottoms, to open the pens of the ſtraw a little; or if he turned a parcel of every wet ſheaf inward, in order to the admiſſion of the air or ſun beams. If this be all that is

requiſite

requiſite, and the operation be performed in a good morning, then, by the time breakfaſt is over, and the cattle yoked, the work may begin upon that ſide of the field which was firſt laid down. The judgment of the farmer however muſt be conſulted upon every point; for no language can make rules ſo accurate and preciſe, as to hit the various degrees of wet or dry, green or win, that may be in a field.

If laſt of all, the ſtate of the corn is ſo bad as to require more handling, and a longer time before it is carried off, then the moſt clear and certain method is, to wale and ſort the whole field, ſheaf by ſheaf. This, if done with diſtinctneſs and care, leaves nothing afterwards under any degree of doubtfulneſs, to cauſe delay, or a repetition of labour. In this operation, the dry hood ſheaves, and all others in good condition, ſhould be laid on that ſide of the ridge along which the waggon comes, turning any part of the ſheaf to the wind, that requires a little drought. All the ſheaves in bad condition ſhould be laid or ſet out upon the oppoſite ſide; but with much more care and attention. This diſtinct ſituation of good and bad ſheaves, ſhould be invariably obſerved over the whole field, by all the labourers employed in ſorting it. A few experienced hands ſhould be ſet to this work: they will be able to know a good ſheaf by its comparative lightneſs, and looſeneſs in the ſtrap; and a bad ſheaf by its weight, and the tightneſs of its binding. A doubtful one muſt be tried, by thruſting one's hand into the middle of it, or his finger beneath the binder's knot. What is found in very bad condition, ſhould have its worſt ſide laid carefully out to the drought; its bottom ſhould be tiezed up, or if need be, the band ſhould be looſed, and the ſheaf ſpread out at full breadth, or in any other way expoſed, that will beſt amend its faults. All the while, particular care ſhould be taken of both knots of the ſtrap, that they be opened and effectually dried; otherwiſe it would be more profitable to throw it aſide, and to make a new one.

It

It is eaſy to ſee, that, after the above ſorting, the waggons may go over the whole field, and carry off but half of its contents. There is however no time loſt by that circumſtance; for, before the whole of the dry corn is taken away, that which was laid out to dry on the other ſide of the ridge, may be either wholly ready for carrying, or ſo great a part of it may be ready, that it can be again ſeparated from the bad, by the ſame hands employed in the firſt ſorting; and the bad itſelf may be ſo managed, as to have thoſe parts, which had hitherto eſcaped the drought, a new expoſed to it. In this ſecond ſorting it would be wiſe, in my opinion, and I have already hinted it, rather to throw aſide a growing ſtrap or handful, and to bind up the ſound by itſelf for carriage, than, for the ſake of what would not amount to a dozen ſheaves, to expoſe ſome hundreds of a field to unneceſſary danger or delay. Nay, 'tis better for the whole, the earlier this ſeparation can be made; for it prevents all future trouble, or delay in ſecuring the beſt; and the worſt itſelf, laid out in ſmall parcels, would ſoon dry; and might, as was formerly hinted, be gathered at leiſure. Thus, with the addition of a few hands, the ſame field can be finiſhed in the ſame time it would have required, had the weather been all along good, and the corns in the beſt poſſible condition for carrying in.

The ſame pains may be uſed, when neceſſary, to ſeparate the good and bad of gayted corn, or of corn in huts. Indeed it is convenient to load a waggon from the huts themſelves, and if the corn is generally in good condition, as one might expect it would be, after it had been already ſorted, in the building of the huts, perhaps the waggoner and forker together may be truſted, without more ado about the matter. For it is perfectly eaſy to them, with the leaſt attention, to throw aſide a bad ſheaf that comes through both their hands. This then ſhould be enjoined them, and even to the ſtack builder, ſince all labourers need, from time to time, to have their attention rouſed to any thing expected from them, which is not their immediate

immediate work. Indeed, if much of this by-work is to be done, better a ſeparate hand were employed, than to run the riſk of their neglecting either of their proper employments, in minding other matters.

Having now diſcuſſed the ſeveral points, relating to the work in the field, I cannot, at preſent, recollect any thing material omitted, but one advice, which is, never to ſpread out much corn at once, unleſs pretty ſure of the weather. To be overtaken with rain, in this ſtate of the field when every part is almoſt ready, muſt be highly diſtreſſing to the careful farmer. I ſhould therefore take occaſion here, from theſe and the like accidents, to recommend to him a careful ſtudy and obſervation of the weather; treaſuring up every judicious hint upon this ſubject that he hears from others, as well as what may have occured to himſelf. The ſhepherd of Banbury's obſervations have been printed, and are much talked of. To me indeed they appear to have been made upon a plain, or nearly ſo; for he takes no notice of the ſigns upon high hills, commonly marked by all who have them within view. Beſides ſome of his obſervations do not ſtrike. Perhaps indeed I have not been ſufficiently attentive to theſe matters; perhaps too, the obſervations being made in an inland or plain country, his ſigns may not exactly correſpond with thoſe obſerved on a ſea coaſt, or among a cluſter of hills. Some of his obſervations are however ſtriking; and if any one is curious to compare them with his own experience and obſervation, he may find an abſtract of them printed (before the calendar) in the Edinburgh almanack, for the year 1773. If farmers are accquainted with the ordinary ſigns of good or bad weather, in the places where they live, a weather-glaſs might be uſeful to them; but not without a ſtrict attention to it; daily marking its riſings and fallings, obſerving their progreſs, and even their indications of continuing, upon the top of the mercury, according to the directions given along with it. Be wary however of truſting to the barometer alone.

But

But if the ſigns of the weather without, correſpond with the indications of it upon the weather glaſs, one may more ſecurely truſt to it.

Of the operations preparatory for ſtacking and mowing Corns.

I now leave the fields, and muſt lead you from thence to the barn and barn-yard. There we ſhall employ a little more of your time and leiſure, if you can beſtow it this way.

This was our ſecond point, upon the third period of harveſt-work. And here keeping a weſtern climate, or a bad ſeaſon, ſtill in our eye, we cannot but commend the uſages of the weſt, particularly, in building large barns and ſmall ſtacks.

A large barn is of great advantage in variable weather. One, for example, may throw into his barn two or three waggon loads, when he dares not ſet the ſtale of a ſtack, however ſmall. Little ſtacks are equally convenient, for one of ten bolls may be begun and finiſhed, when one of thirty or forty muſt not be undertaken. Beſides, the advantage of a ſmall ſize is viſible, when one cannot truſt to the good condition of his corn. In ſuch ſtacks, the external air penetrates to their very centers, or very near them. The heat of them therefore can never be very great, nor widely extended. If it ſhews itſelf at all, it can only be when the ſtack through time ſubſides, and ſhuts its pores, ſo to ſpeak. This commonly happening very late, may ſurpriſe the farmer, perhaps, after he thought all danger was over; but it is its only inconvenience: for a ſheaf or two pulled out to the leeward, in order to let out the ſteam, will cure it as ſoon as it is perceived. And if he pleaſes, one or two pulled out to the windward will aſſiſt its flight, and ſupply its room with cool air. If the farmer finds it needful, he can multiply ſuch air paſſages, at different heights, and in different directions, at pleaſure; and that without any inconvenience, if he only takes care, that the balance of the ſtack be not deſtroyed, by pulling out too much on one ſide, in the very great hurry of mending it.

it. If the weight above tends to fill up the air holes, a few branches thruſt into them will keep them open, till all danger is over.

If the ſmallneſs of the barn-yard obliges the farmer, or his own conceit inclines him, to have large ſtacks, writers on huſbandry recommend a funnel, drawn up in the centre of the ſtack, from the bottom to whatever height is moſt convenient. This is made in England, by ſetting a ſack full of chaff in the middle of the ſtale, and building round it; as the ſtack advances, the ſack is drawn upwards from time to time, till the funnel is high enough; and then the ſack may be pulled out, and the hole above drawn to a point, or covered. The heated air, ſay they, finds its way upward by this conveyance, and ſo flies out at the top. It would however be an improvement of this convenience, were the air from without admitted into it, from time to time. This might eaſily be done by a level pipe, reaching from the outſide of the ſtack upon the windward ſide, to the center funnel, or near to the ſame. And the pipe may be laid upon the ground, or even two or three foot above the ground, if that height is neceſſary to catch the wind.

Others recommend well hewed ſtown pillars and covers, clad above with ſmall timber and bruſhwood, on which the corn is laid. Theſe foundations have ſeveral advantages; the corns are liſted up into the air, out of the reach of dampneſs from the earth; the wind blows through beneath them, as well as round them, with good effect: and laſtly, if they are rightly made and the pillars three feet above the ground, no rats nor mice can get into the ſtack. This laſt advantage is the chief deſign of ſuch pillars; and indeed it is a great ſaving, in ſome years, and in ſome particular ſituations. In the mean time, care muſt be taken, to leave no ſtraw beneath the ſtacks that are built upon them, no poles nor ladders leaning to them; by which ſuch vermin may get up or down, otherwiſe all the expence and labour,

ſo far as regards them, is wholly loſt. The expence of them is indeed great for a poor farmer, who hath not much to ſpare, after his rent is payed. A circular one, that could hold from forty to ſixty bolls, coſts in ſtone, hewing, &c. about ſix pounds. One I have, that holds from ſixteen to twenty four bolls, coſt me in ſtone work above three pounds, beſides half a guinea, for the ſmall timber and bruſh-wood. Yet I would not have wanted its convenience, not to ſay its beauty, for more than the money, But however elegant and uſeful they may be, let us rather conſider them here as a kind of ornament to the barn-yard of a gentleman farmer, than as conveniencies for his poor tenants, that cannot ſpare the expence. And let us recommend to them a cheaper, and at the ſame time an equally uſeful plan. A plan which, while it anſwers every purpoſe of the other, ſhall ſcarce coſt ſo many ſhillings as it does pounds. It was contrived and executed by a farmer, Thomas Orr in Ernock, who has experienced its advantages for ſome years paſt.

This farmer has his ſtack-yard upon a little riſing ground, in reſpect of the neighbouring fields. He began by cutting a ſmall trench from the outſide of his yard dyke, to the place, where the center of his ſtack was deſigned to be. This trench ſtraight in the bottom, and as near the level as the riſe allowed him, was about eighteen inches or two feet wide. He lined it on both ſides with common field ſtones; over which he laid a covering of flagg ſtones, leaving a vent hole open under the center of his ſtack, to let up the wind into it. This vent-hole, like the reſt of his pipe, might be about nine inches wide. And having dreſſed down the earth, that was thrown out of his trench over the flagg coverings, and into any hollow places around him, his work was done for the time. Againſt the harveſt ſeaſonThomas gathered a good bundle of ſmall ſticks, or rods, which he laid up to dry, and be ready for uſe. When he begins to build his ſtack, he ſets up his bundle of rods over the center vent-hole, ſpreading them a little below, that they

they may ſtand firm; and tying them looſely above, by a withy, or thumb rope of ſtraw. Around this bundle, he builds his ſtack to what circumference he pleaſes; and at laſt above it, to what height he pleaſes. And when it is finiſhed, he is at eaſe with reſpect to ſo much.

By this trifling expence, ſcarce above two days labour of his own hands, does this ingenious man ſecure his corns in the yard againſt all poſſible danger. For his logie from the outſide draws the air ſo ſtrongly, if the wind is near that quarter, that he fears no danger from heating in the ſtacks. Nor, 2*dly*, does he run half the hazard in the fields, that his neighbours do, by keeping out their corns a long time to win them; for he dares to put in his, if cut dry, much ſooner than they can with ſafety venture theirs. And, laſtly, which is ſtill more notable, he makes uſe of his logie and funnel pipe, for the capital purpoſe of the pillared ſteddings above deſcribed. For if he ſuſpects that any of his ſtacks are infeſted with mice, he diſlodges and deſtroys them in an hour, or ſo, at almoſt no expence at all. Whenever he finds that the wind anſwers him, he carries out a ſhovel full of hot cinders, and having placed them in the logie, or mouth of his funnel, he only ſtrows upon them a little brūiſed brimſtone. This in a little time, begins to ſhow its effects throughout the whole ſtack; ſo that, by applying his ear to any ſide of it, he can hear within a ruſtleſs noiſe, attended with a cheeping cry, which ſhew the whole mice to be in motion, and, at the ſame time, in diſtreſs from the very air they breathe. After this they begin to ſet out their heads for a gulp of freſh air; and may now be ſeen by an attentive eye. Thomas goes round with the grey plaid about him, and contemplates the effects of his own ingenuity, with peculiar pleaſure; for he expects them, and looks for them. At laſt the mice being no longer able to endure the ſtench within purſuing them, are forced to deſert their winter habitations; and ſo drop down in their preſent ſickly and feeble ſtate, an eaſy prey to the

the dog and cat, who are both of them taught to watch and deſtroy them, on ſuch occaſions.

All this is moſt natural, and when told with ſimplicity by the man himſelf, can ſcarce admit a doubt. Thomas adds further, that this ſcheme is much more effectual to all his purpoſes, in a pretty large and cloſs built ſtack, than in a very ſmall and looſe built one: becauſe, when the ſtack is of little compaſs, and not preſſed ſufficiently together by its weight, the air finds, more eaſily and readily, ſome vent for itſelf near the bottom, through which it eſcapes, without paſſing through the whole ſtuff, and ſo producing all its deſigned effects. Whereas, in a greater and more compact body of corn, the air is obliged to find its way through every ſmall ſpace between the ſtraws, before it can get out. This too is abundantly natural and obvious. Inſtead then of doubting the facts, as ſome at a diſtance may incline to do, or of deſpiſing the efforts of genius, as ſome neighbours may do, who cannot doubt the facts, we ought all to be ready to make a fair trial before we decide againſt the meaſure: and the rather that, while our own intereſt is at ſtake, the experiment can coſt us nothing.

Some will perhaps object, that their barn-yards are not convenient for ſuch experiments. For example, they may think them not ſufficiently raiſed, not expoſed to the weſt wind, which is the trade wind of this country; or that they are too cloſs on all hands, to receive any benefit from ſuch trials. But none of theſe difficulties appear to me unſurmountable. Suppoſe the barn-yard were not above the level of the neighbouring grounds, the air pipe might be built, if of ſtone, above the ſurface itſelf; or a rhone of wood could be made for the purpoſe, communicating with the center; and it might be either laid on the ground, or two feet above it among the ſtuff, in order to catch the wind the better. If the ſtack-yard declines to the north, or eaſt, a trench caſt in any of theſe directions, would certainly anſwer the purpoſe, nearly as well as one to

the weſt or ſouth. For if the wind is not ſo violent in ſuch directions, it is generally harder, and more drying in its nature. Laſt of all, if the barn-yard is too cloſs fenced, it muſt, at any rate, be very bad for the purpoſe of keeping victual; therefore it ſhould be laid more open: and the ſituation muſt indeed have been at firſt ill choſen, if it does not afford a proper opening on ſome ſide. But not to ſtay on ſuch particulars, a willing mind will conquer the difficulties of any ſituation whatever.

The ſame principles and works will apply to a barn-mow, as to a ſtack in the yard; and will doubtleſs have the ſame effect. A little paſſage might eaſily be made through the foundation for the back mow, at the time of building; the fore mow may be ſupplied with air from the open ſpace between the doors, by a ſmall wooden rhone placed on the floor, or at what heighth above it may ſeem neceſſary: or, laſt of all, either of theſe may be ſupplied, by placing a triangular rhone in the three cornered windows, commonly made in country barns. If the air is conveyed by theſe, three or four feet within the body of the mow, it will anſwer the purpoſe, when the mow is rightly built, or has any opening for the air to aſcend by. A friend of mine has contrived ſomewhat of this kind; but he carries his rhone, or conveyance, acroſs the barn, from window to window, with openings to let out the air in its paſſage. My opinion was, that he would be better to have no communication from air hole to air hole, for thus the wind was apt to paſs through too rapidly for any great effect; but if he meant to force it up through the whole maſs of ſtuff, it would be better for him to cut out five or ſix feet from the middle of his rhone, that the piece at each ſide might terminate in the ſolid mow, or near any ſmall vent upwards. Then on whatever ſide the wind blew, it would be forced to aſcend, and to find its way through ſome part of the maſs. The piece cut out might be better employed elſewhere.

Air

Air holes in barn walls are certainly uſeful in ſome meaſure, without any additional improvement. But as they ſtand at preſent, their uſe is very ſmall; for when the mow begins to ſubſide, as all mows do through time, it naturally cloſes up its own pores and interſtices, ſo that little air can be admitted to the center, where it begins to heat, and needs it moſt. Add to this, the more damp the corn is, and the greater its danger of heating, the weightier is it, and the readier to ſink and clap together, which muſt in courſe haſten and increaſe its deceaſe. Laſt of all, the very ſinking and contraction of the mow looſens it in ſome meaſure from the walls, leaving a ſmall ſpace between them and the corn, into which the air, admitted by the barn windows, enters; and round which it circulates, without penetrating the corn itſelf. From all which views of the caſe, air holes, as they ſtand at preſent, are not ſo uſeful as they might be made. But if the air admitted by them was conveyed, by means of a wooden rhone, or a little bruſh-wood, two, three, or four feet, within the body of the mow, where the real danger is, it might do the moſt effectual ſervice to heating, or already heated corn.

There is nothing to hinder theſe four or five feet rhons, to be laid in ſtacks of any ſize, at the building of them, on different ſides, and at different heights, and to what number, and indeed of what greater lengths the farmer ſees needful. If ſuch implements of huſbandry were in common uſe, and prepared for the purpoſe, I ſhould not be ſurprized to hear the ſtack builder calling for them, when he was laying on a waggon-load of his greeneſt or dampeſt corn. Their obvious advantages would ſoon recommend them to every body.

Obſerve, that one homeward grown fir-tree from a ſhilling to eighteen pence price, ſawed into boards an inch thick, and cut into proper lengths and breadths, would ſerve all the purpoſes of an ordinary barn and yard. They might be three cornered in their form, and ſcarce above three or four inches in their ſides. And what is the expence in compariſon with the

the riſk yearly run, and the damage often ſuſtained, in both barn and yard? Nay, what is it in compariſon of the toil and anxiety, occaſioned by ſuch accidents?

Further, my opinion concerning the management of theſe thones, and of all other air pipes or funnels, is this, that they ſhould be ſhut up for eight or ten days, and perhaps more, after the ſtack or mow is built, till the heat begins to ſhew itſelf on the end of the hand-ſtaves, for heat itſelf, when kept in due bounds, is an excellent drier. When the heat begins to be felt by drawing out one of the hand-ſtaves, and we may judge from thence, that the air within is beginning to rarify and expand itſelf; then is the critical time of opening the holes, and admitting the cold air into the mow or ſtack: for at that time the vacuum, ſo to ſpeak, occaſioned by rarifaction and ſudden condenſation, will attract and draw the freſh air, like a well going chimney, over a well kindled fire. This freſh recruit of air again, mixing with the moiſt and warm vapour within, will in time alſo be expanded and rarified; and ſo carrying the vapour along with it, will eſcape through every pore and interſtice of the ſtuff, into the open air, till nothing is left behind but cool air. And if the ſtack, or mow, was in very bad condition, by being ſuffered to heat too much, the ſteam, as is common in ſuch caſes, will be even viſible to the eye as it flies off. This is the philoſophical account, which I gave to Thomas Orr and others, of the effect. The language may be ſtrange to common farmers; but the reaſoning is juſt, and experience will incline ſuch reaſonable minds as have attended to the effect, to believe it will hold, though the language in which it is expreſſed, may not be ſo familiar to them, or the properties of air be not underſtood. If the farmer makes the trial, I could wiſh he would ſuffer the heat to be ſenſibly felt before his trail, that he may be convinced of the change that muſt happen. On the other hand, I hope he will not ſuffer the heat to increaſe too much, or to continue

nue too long, before he opens his vent-holes, and gives his corns the neceſſary refreſhment. And this is all the caution needed upon the point.

If any of thoſe methods for preſerving victual were tried, and the farmer were well provided with every thing neceſſary before-hand, that the trial might be thoroughly made; I am convinced, that much of the corns, which in bad harveſts are loſt, or ſpoiled, might be preſerved perfectly ſound, for the uſe of man or beaſt. If this were the caſe, the farmer could never be in hazard of loſing his next years crop, by ſowing ſeed too much browned at the ends by mow-burning. A calamity that is but too often, and ſeverely felt by the careleſs ſluggard; while, from the ſame circumſtance, the prudent farmer is ſometimes obliged to renew his ſeed, when there is otherwiſe no immediate call for that expence or trouble.

I have ſaid nothing here, as yet, of building ſtacks or mows, for their preſervation from heating. If no air funnel is carried up the middle of either, it would be certainly neceſſary to ſet a great deal of the corn upon one end, in the place of ſuch funnels; that is, ſetting the ſtale a new, above the ground ſtale, and ſo on, another above that, till the ſtack or mow is brought near the top. What is further neceſſary in order to preſerve ſtacks from wet weather, will be mentioned on the next particular of this period.

[*To be concluded in our next.*]

THE SCOTS FARMER,

SEPTEMBER 1773.

ARTICLE LXXIII.

Of Manures——Aſhes—Soot—Sea-weed or Ware—Shells—Vegetables in an entire ſtate, or ſown for Manure—Water—Compound Dunghills—Such Manures as cannot be obtained in large quantities.

[Dickſon's Agriculture, Vol. I.]

Of Aſhes.

ASHES contain a large proportion of ſalt; they attract acids more violently than any other thing as yet known, but they ſoon loſe their virtue.

The effects of Aſhes will then be of the ſame kind with lime. But as aſhes contain ſalt, their operation will be more ſudden; as they attract acids with greater violence, and ſooner loſe their virtue, their operation will be more violent, and ſooner over. This is confirmed by experience. The firſt crop, after land is manured with aſhes, is commonly very luxuriant, and the ſecond crop exhauſts almoſt the whole of their virtues.

As the effects of aſhes are ſudden and violent, they ſhould be applied in very ſmall quantities; and as they operate in the ſame way with lime, they ſhould not be applied to land exhauſted by lime or marle; ſhould not be followed by theſe, or repeated.

Here it is proper to conſider the burning of turf as a manure.

Turf is compoſed chiefly of vegetables; that which remains then after burning, muſt be of the ſame nature with aſhes. To theſe the fertility communicated to the ſoil is chiefly owing. It is found from experience, that in proportion to the number of roots contained in the turf, the burning turns out to advantage; and therefore land, with a tough ſward of graſs upon it, is recommended as the kind moſt proper for being improved in this manner.

The heat which part of the ſoil receives from burning the heaps of turf, is ſuppoſed to contribute to its fertility: but this can have little influence, except to deſtroy any ſeeds or roots of weeds that may be in the land.

In burning the turf, care muſt be taken to cover the heaps in ſuch a manner as to prevent the fire from breaking out into flame. Where this happens, it is obſerved, that the aſhes loſe part of their virtue, and that the parts of the field manured by them are not ſo much enriched as the other parts are by the heaps of turf that are burned without flame. It is natural to think, that the earth of the turf, when properly piled up, will retain the oils of the vegetables, and prevent them from aſcending into the air in ſmoke and flame.

This makes ſome difference betwixt the manuring by burning and the manuring by aſhes. However, as the oils contained in burned turf are in very ſmall quantities, we may well ſuppoſe, that they will ſoon be exhauſted by the ſalts; and therefore, though the effects of burning may be more violent, yet will be equally ſudden, and as ſoon over.

To prevent burnt land from being exhauſted, one crop only, or two at moſt, ſhould be taken, and then turned into graſs for paſture. If a little dung is added after the firſt crop, its fertility will be the longer preſerved.

A late writer pretends to point out a method, by which poor land treated in this manner may be enriched for many years; and which, he ſays, was a ſecret before. The method he points out is, to dung the ſecond year after burning. It is not

not to be doubted, that the aſhes, having the vegetable food of the dung to work upon, will have a better effect, and exhauſt the ſoil much leſs than when there is no dung mixed with it. If the laying on of the dung is delayed till the fourth year, ſays our author, it will have no effect If the the truth of this was aſcertained by repeated experiments, we would be obliged to acknowledge that dung does not operate in the manner we have deſcribed. But it is probable, that our author meant no more by this, than that the laying on of dung the ſecond year is by far more advantageous than delaying it till the fourth Dung, as has been obſerved, has every property of a manure; not only enlarges the vegetable paſture, and fits the vegetable food for being nouriſhment to plants, but alſo contains this vegetable food in itſelf; and therefore, if it is laid on in a proper manner, and in ſufficient quantities, will enrich land, whatever is its kind, or in whatever manner exhauſted. Our author ſays, that the applying marle inſtead of dung will have the ſame effect. What he ſays will indeed rather hold true of marle than of dung. Land exhauſted by burning will not be recovered by marle, for they operate much in the ſame way. If the marle is applied before the land is exhauſted, it will preſerve it ſome time by the power it communicates of attracting the vegetable food from the air. It is more than probable, however, that all the benefit ariſing from the application of marle in this manner would not anſwer the expence.

Of Soot.

Soot cannot be procured in ſuch large quantities as to be uſed by itſelf, excepting in the neighbourhood of large cities; it is needleſs therefore to inſiſt much upon it.

It contains oil, ſalt, and earth. Theſe, it ſeems, are compounded in ſuch a manner as to be ready to be conveyed into the roots of plants by water. For the effects of ſoot, when ſpread upon the ſurface, are diſcovered immediately after the

firſt

firſt rain. It promotes vegetation in the ſame manner as dung or ſhell marle. It encreaſes the food of plants by the ingredients of the vegetable food which it contains. It enlarges the paſture of plants, enables the ſoil to attract the vegetable food from the air, and prepares it for entering the roots of plants by the ſalt that it contains, which is of the alkaline kind, attracts and ferments with acids, and attracts and diſſolves oils

As it contains great plenty of vegetable food, and as its effects are ſudden, it muſt be laid on in very ſmall quantities. Sowing it in the ſpring on winter-corn or graſs, ſeems to be the moſt proper way of uſing it.

When the quantity laid on is but ſmall, and its effects ſudden, it cannot be ſuppoſed to laſt long. Its virtues are commonly exhauſted by one crop.

When its effects are over, the ſoil is left in the ſame ſituation as before it was laid on, not exhauſted of its vegetable food as by lime or aſhes; and therefore it may be repeated; or it may be followed by theſe manures, as it is very proper to be applied to land that is exhauſted by them.

Of Sea-weed or Ware.

All the plants that grow upon the rocks within reach of the ſea are good manures. Thoſe that grow upon the rocks that are almoſt always covered by the water, are the richeſt.

Some kinds of ſea-weed are burnt for kelp. This, it is thought, turns out to greater advantage than uſing them as manures. The beſt kinds for manures cannot be reached, as their roots are almoſt always below water: but they are frequently driven aſhore by the ſea. A conſiderable quantity of them may always be expected on the ſhore in the neighbourhood of the rocks where they grow, when a ſpring tide, heavy rain, and a high ſwelling ſea, all happen at the ſame time. The ſpring-tide expoſes their roots to the air, the freſh water falling in rain, looſes the roots, and the high ſwelling

ling ſea tears them up. Sometimes the tide carries them to a conſiderable diſtance.

They are of a ſoft pulpy nature, eaſily diſſolve, and ſoon putrefy; and they contain oil, ſalt, and earth. They muſt promote vegetation therefore in the ſame manner as dung or ſoot.

Their effects are ſooner over than thoſe of dung mixed with vegetables from a dunghill; for they ſooner diſſolve and ſooner putrefy.

They may be applied to ſoil in any ſituation, and are very proper for land that is exhauſted by lime or aſhes.

When their effects are over, the land is in no worſe a ſituation than before they were applied, and any kind of manure may be applied after them.

They oftener they are applied, the land becomes the richer; for the earth of which they are compounded, is of the abſorbent kind. This is confirmed by experience. The lands near the ſhores, where theſe ſea-weeds are in greateſt plenty, and have been long uſed as manures, are amongſt the richeſt in Scotland, and have been kept almoſt conſtantly in tillage.

They are preferable to dung in this reſpect, that they do not produce ſuch a quantity of weeds. Every perſon that has uſed theſe manures, knows, that weeds do not appear in ſuch plenty upon land manured with ſea weed, as upon land manured with dung. This ſeems to confirm the opinion of thoſe who aſſert, that the great quantity of weeds that appear upon dunged land, are produced by ſeeds mixed with the dung. But it is ſubmitted, whether this difference is not owing to the great quantity of ſalts contained in the ſea-weed and applied with it, which at firſt deſtroys ſome of the ſeeds and roots of weeds. Salt, applied in too large a quantity, is undoubtedly a poiſon to many plants. According to Mr Tull's experiments a ſmall quantity of ſalt-water deſtroyed a plant of mint. It is obſerved likewiſe, when any graſs upon the

ſhore

ſhore is overflowed by a ſpring-tide, it withers away in a few days, and does not recover till it gets a plentiful ſhower. Then indeed, by the freſhneſs of its verdure, it is diſtinguiſhed from the graſs that was not overflowed by the ſalt-water. That it is the ſalt in the water that deſtroys the plants, is obvious: for the ſame quantity of freſh water would have had no ſuch effect. And it is probable, that the oils attracted by the ſalts, and carried down by the rain, is the cauſe of their recovery.

Of Shells.

In many places, particularly near the ſea-ſhore, broken ſhells are found in beds. Theſe are uſed by ſome as a manure.

They ferment with acids, and, like other animal ſubſtances, contain oil, ſalt, and earth. The oil and ſalt are not in great quantities in proportion to the earth, and they take a long time in diſſolving.

Their operation muſt be of the ſame kind with that of ſhell marle, but ſlower and weaker.

They make ſome addition to the vegetable food by the ingredients of this food of which they are compounded. They communicate to the ſoil a power of attracting this food from the air; and they diſſolve it by the ſalts which they contain and produce. And they increaſe the paſture of plants by their fermentation.

They operate chiefly by enlarging the paſture of plants, and preparing the vegetable food for entering their roots. They are ſo long in diſſolving, that the quantity of oil communicated in a ſeaſon muſt be ſmall in proportion to the ſalts which they produce. Though theſe are their principal operations, yet in them they are inferior to lime, marles, or aſhes.

As they take a long time to diſſolve, and do not operate quickly, it is neceſſary to apply them in large quantities. For without this their operations will ſcarcely be perceptible.

For the ſame reaſon, it may be expected they will continue for a conſiderable time. They will continue till the

the ſhells are wholly diſſolved, and all their oils exhauſted in vegetation.

As they operate chiefly by enlarging the paſture of plants, and fitting the vegetable food for entering their roots; they will in ſome degree exhauſt the land of its vegetable food, though not ſo much as lime or aſhes do, as they communicate ſome oils to it in diſſolving. It is not proper therefore to apply them after lime or aſhes, to repeat them immediately, or apply lime and aſhes after them.

If they are taken up from below the ſurface, as muſt happen moſt commonly, it is proper to allow them to lye ſome time expoſed to the air before they are plowed down. This will not only aſſiſt their fermentation, but will alſo promote their putrefaction.

As lime, when mixed with them, takes a very ſtrong band, it is probable, that the mixing them together in the application may in ſome caſes produce very good effects.

Of Vegetables in an entire ſtate, or ſown for Manure.

It is a practice in ſome places to ſow turnip, buck-wheat, peaſe, &c. on land, and, when grown up, to plow them down for manures.

Theſe may be called vegetables in an entire ſtate, to diſtinguiſh them from dung made of putrefied vegetables; though no vegetable can be a manure till it is putrefied.

As theſe vegetables receive their food from the ſoil on which they grow, it is natural to think, that when plowed down, they do no more than reſtore what they have taken; and therefore, that by this operation land cannot be rendered more fertile than before; at leaſt cannot communicate ſuch a quantity of vegetable food to it as may be done by frequent plowings. For the vegetables, though plowed down, are not all preſerved; a part of them being uncovered is blown away by the winds. Beſides, the plants while growing cover the ſurface, and prevent the vegetable food in the air from entering the

ſoil.

ſoil. Whereas, when land is frequently plowed, none of its vegetable food is exhauſted, and it is expoſed to receive all the benefits from the influence of the air. But, notwithſtanding this, ſome aſſert from experience, that a crop of ſuch vegetables as thoſe mentioned, plowed down, render land more fertile, than frequent plowings without the application of manure.

To account for this upon the principles eſtabliſhed, let the the following things be conſidered.

The ſoil, manured by plowing down a crop of vegetables, receives all the vegetable food contained in the ſeed ſown. This quantity in peaſe and buck-wheat is not very inconſiderable. The quantity in one grain is probably as much as there is in a whole ſtalk after the ſeed is fully ripened. It is obſerved, that plants, when cut green, exhauſt land of its vegetable food, but in a very ſmall degree to what they do when allowed to carry ſeed.

Some of the plants mentioned puſh down their roots below the reach of the plough, and bring up the vegetable food lodged there to the ſurface. Peaſe, turnip, clover, and other plants, puſh down their roots very far; and whatever vegetable food they find, is ſucked up; and when they are plowed down, this vegetable food is lodged near the ſurface, and thereby the quantity within the paſture of ſome other plants, ſuch as wheat and barley, is increaſed. A late author makes a calculation of the quantity of vegetable food which clover in this manner communicates to land, and repreſents it as very conſiderable. In few places, the ſoil is ſo deep as to have the vegetable food in great plenty beyond the reach of the plough; and thereforee it is probable, that this author, in his calculation, makes the quantity of this food brought near the ſurface by clover much greater than it really is. However, it is certain, that as plants puſh down their roots below the reach of the plough, they there find nouriſhment, which is communicated to their ſtems and leaves; and therefore, when theſe are plowed down, the quantity of vegetable food near the ſurface is encreaſed.

The

The covering of the ſurface ſeems to be an advantage; for thereby the air in the ſoil, not having a free communication with the external air, becomes putrefied, by which a fermentation is raiſed, and the vegetable paſture enlarged. Whatever is the cauſe of this fermentation, the fact itſelf is obvious. Every farmer knows, that when the ſoil has been covered for a conſiderable time by a ſtrong crop of peaſe, or any other kind of corn laid down, and what is commonly called *ſtooming*, though naturally hard and ſtiff, becomes mellow, ſoft, and free, and obviouſly in a ſtate of fermentation. It is probable, that this is occaſioned by the corruption of the air, or of the water, which the covering of the ſurface prevents from being exhaled.

To theſe things it may be added, that it is not impoſſible but the plants when growing may ſuck in the vegetable food from the air in as great plenty as the ſoil would have done, though there had been no plants growing upon it. If plants have this faculty, conſidering what an immenſe ſurface is expoſed by them to the influence of the air, the quantity of vegetable food acquired cannot be inconſiderable.

Of Water.

Water has been conſidered as an impediment to vegetation; it is now to be conſidered as a manure.

It has already been obſerved, that rain-water contains vegetable food. Chymiſts tell us, that it actually contains a large proportion of oil. If a quantity of it is therefore collected and let in upon a field, it will leave upon it ſome of the vegetable food which it contains.

It has been obſerved likewiſe, that when rain falls in great quantities on land which has a conſiderable deſcent, in running off, it carries along with it ſome of the fineſt particles of the ſoil, and the vegetable food contained in them †. If this water

† This appears likewiſe from the colour of the water, and the mud which it leaves behind it in hollow places.

water then is let in upon a field, and allowed to ſettle, the land will receive from it not only all the vegetable food contained in the rain, but alſo all that is contained in the particles of earth which it has carried off from other lands.

This method of manuring land can be uſed on ſuch fields only as ly on the ſides of rivers, and is proper only for ſuch as can be eaſily drained.

In practiſing it, care muſt be taken that the water does not run over the field with violence, but ſo gently, that it may leave behind the mud which it contains. If the water is allowed to run over a field with violence, it is in danger of carrying off the vegetable food inſtead of giving it a ſupply.

Land in graſs is the moſt proper for being manured in this manner. The firmneſs of the ſurface prevents any of the ſoil from being carried off, and the graſs entangles the mud, and any vegetables that are in the water, and prevents them from getting away.

If the river made uſe of in this manner runs through fertile land, more benefit may be expected. Its waters after rain muſt contain the greater plenty of vegetable food.

This operation ſhould be performed in the ſpring-ſeaſon. In that ſeaſon land in graſs ſuffers leaſt from being overflowed. Lands being almoſt all plowed, the rain carries off the greateſt quantity of vegetable food; and in that ſeaſon it is ſaid likewiſe, that the rain-water contains the greateſt quantity of oils.

In ſome places it is a practice, to let clear water over land, whether in graſs or tillage. From this practice, it is ſaid, the land receives great benefit. Some kinds of graſs plants may require a greater proportion of water than ordinary to promote their vegetation, and may receive benefit from this practice. Clear water, eſpecially if it comes immediately from ſprings, can ſcarcely have any other effect. It muſt be acknowledged, however, that if water runs along a bed of marle, or chalk, or lime-ſtone, it will acquire ſome of their qualities;

qualities; and, if let upon land, will operate in the ſame manner with theſe manures *.

Of Compound Dunghills.

The ordinary dunghills belonging to a farm, may be called *compound dunghills*. They are made up of the dung of different animals, of different kinds of ſtraw, and other vegetable ſubſtances; and they have frequently different animal ſubſtances in their compoſition.

The dunghills which we propoſe here to treat of, are of a different kind, made up of earth, mixed with dung from an ordinary dunghill, lime, and other manures.

Some perſons make dunghills of this kind, and are of opinion, that the dung and other manures, with which they are compounded, are thereby made to enrich a greater quantity of land, than if not mixed with earth; and, beſides, do not produce the bad effects which ſometimes are produced by dung, when taken directly from a dunghill, and laid upon land.

It will not be amiſs, that we enquire into the advantages of this kind of dunghills; which will be a means not only of recommending them, but alſo of pointing out the moſt proper method of conſtructing them.

The firſt thing to be enquired into is, the advantage ariſing from the mixing lime, marle, or other manures, with the earth and dung. Lime, as it is a diſſolver of all vegetable and animal ſubſtances, when mixed with dung, will help to diſſolve it; and as it communicates an abſorbent power to earth, will enable the earth with which it is mixed to attract the vegetable food in greater plenty from the air. But in order to make it produce theſe effects, it is neceſſary to mix it with the dung and earth; for, if the lime is laid in a kind of *ſtratum*, above the dung, and below the earth, it will abſorb the water

* Lime-ſtone has the ſame qualities with lime; it attracts and ferments with acids, and produces ſalt.

water that falls upon the dunghill, and thereby will prevent the dung from receiving a ſufficient quantity of water to make it putreſy; and will alſo occaſion ſuch a heat, as to burn the dung, and render it uſeleſs; and, beſides, can have but little influence in diſſolving the dung, and communicating to the earth its abſorbent quality If the lime is laid above the earth, and expoſed to the air, it will be attended with the ſame conſequences, it will abſorb the water; and though it will attract the vegetable food from the air, yet will be of no more uſe for this end, than if ſpread upon as much land as the ſurface of the dunghill extends to.

The ſame thing may be ſaid of marle, if uſed inſtead of lime. But, if marle is uſed inſtead of earth, it is probable that the compoſt will become very rich, as the marle has a very ſtrong abſorbent quality, and would be greatly expoſed to the influence of the air. A much ſmaller quantity than is uſed in the ordinary way, it is probable, would be found ſufficient, and its effects would be ſooner diſcovered. If this is tried, it will be neceſſary to carry the dung to the marle pit, and there form the dunghill; for marle is ſo heavy a body, that it would be too expenſive to carry it firſt to the dunghill, and then to the field.

The advantage of mixing dung with the earth is next to be conſidered. This, it is probable, is the principal advantage of the compound dunghills, and that the advantages ariſing from lime are but trifling. They are often made without lime, and their effect, it it ſaid, are equally good.

Dung, in the ordinary dunghills, has its vegetable food ſometimes waſhed away by rain, when it falls in large quantities. Now, this is prevented by the earth in the compound dunghill, which abſorbs the water, and all the vegetable food which it carries from the dung.

In the ordinary dunghills, the dung on the ſurface, it is generally ſuppoſed, loſes a part of its vegetable food, which is exhaled by the ſun, or carried off by the wind. This is

prevented

prevented by covering the dung with earth in the compound dunghill.

But it is probable, that the compound dunghill receives its principal advantage from the earth being expoſed to the influence of the air: and, if this is true, the more abſorbent that the earth is which is uſed, and the larger that the ſurface of the dunghill is, in proportion to its bulk and quantity of dung contained, it will be the richer.

This directs us to the proper method of conſtructing it, to make it long and narrow, with as many diviſions in it as can be made conveniently; for thereby a larger ſurface is expoſed in the ſame quantity, and the more vegetable food acquired.

It is proper to obſerve further, that earth ſhould always be in the bottom of the dunghill, to receive any of the juices of the dung which the rain may carry downward; that the dung ſhould be immediately covered with earth, to prevent the juices from being exhaled, or carried off; and that the earth ſhould be expoſed for a conſiderable time, before any more dung is laid on, that ſo it may receive all the benefit from the air which it is capable of, before it is covered.

This kind of dunghills is made with leaſt expence upon the field for which the dung is intended. The head-ridges are commonly high raiſed, by the turning of the ploughs upon them, and contain the richeſt earth in the field. Theſe are very proper places for the dunghills. The earth is at hand, and can eaſily be thrown upon the dung.

Thoſe that treat of dunghills of this kind, commonly recommend earth as oppoſite as poſſible to the nature of the ſoil upon which the dung is to be laid. They recommend clay for a light ſoil, and light earth for a clay ſoil. But theſe the farmer cannot always command; and beſides, though he can, will frequently find it very expenſive to carry them. It is probable, that there is not ſo much in adapting the earth of the dunghill to the kind of ſoil, as perſons at firſt ſight are apt to imagine. It is certain, that there cannot be ſo much in it

as to anſwer the expence of leading earth. It is true, that, in many farms, there are different ſoils, and, therefore the dung may be carried to a ſoil different from the ſoil of the field for which it is intended; there the dunghill may be formed, and from thence carried to the field. But ſtill this is an additional trouble and expence; and therefore this method is not to be followed, till, upon a comparative trial, the advantages are found to do more than anſwer the expence.

It is a practice in ſome parts in Scotland, to lay clay upon clay-land *. This practice, it is ſaid, ſucceeds very well; which makes it probable, that it is not very material what kind of earth is uſed for the compound dunghill, provided it is of the abſorbent kind: and, therefore, the farmer need not be anxious about getting earth different from his ſoil, but may make his compound dunghill of the earth of the field which he intends to manure.

Of ſuch Manures as cannot be obtained in large quantities.

Beſides the manures already treated of, there are a variety of other things that greatly promote vegetation; the different parts of animals, ſuch as hair, wool, horn, ſkins, &c.; alſo parts of plants, ſuch as ſaw-duſt, malt-duſt, rotten wood, bark, &c. Theſe are all good manures. They promote vegetation in the

* The ſoil of the Carſe lands, upon the river Forth, is a very ſtiff clay, and yet it is a general practice among the farmers of thoſe lands to dig clay in the ſummer ſeaſon, and mix with dung. This, they ſay, turns to a very good account. It is probable, therefore, that there is not much depends upon the kind of earth uſed in the compound dunghills; and that the principal advantage of thoſe dunghills is the expoſing the earth to the influence of the air. However, if the farmers that follow this practice could be prevailed upon to try the earth of a head ridge, inſtead of digging clay, their work would be done with much leſs trouble, and at much leſs expence; and the dunghill, it is probable, would be as rich.

the ſame way as dung; and their operations are ſlow or ſudden, as they diſſolve with greater or leſs difficulty. They may be uſed in all kinds of ſoil, as they contain vegetable food; and any kind of manures may be applied to land after their operation is over.

Though they cannot be obtained in ſuch large quantities, as to be uſed by themſelves; yet they ought not to be thrown away, but mixed with the dung in the dunghill. All of them, the animal manures in particular, will not only add to the vegetable food in the dunghill, but alſo greatly promote its putrefaction.

ARTICLE LXXIV.

A Letter to the Weſt Country Farmers, concerning the Difficulties and Management of a bad Harveſt. Continued from No. XI. p. 574.

Of the methods of building, covering, and roping Stacks; and the Proviſions neceſſary for theſe Operations.

THE third branch of this laſt period of harveſt work, relates to the covering of ſtacks properly, in order to preſerve them from external injury, and to the proviſion neceſſary for that purpoſe.

Little needs to be ſaid to our weſt country farmers, upon the method of covering and roping ſtacks. Their own method, in both, ſeems to be commendable. Their miſmanagement is chiefly obſervable, in their being often unprovided with the materials requiſite for theſe operations, when they come to be needed; and, perhaps, in their want of care in building their ſtacks, ſo as to defend them effectually till their covering is prepared. Something therefore ought to be ſaid to them upon theſe points; and after that, a few words ſhould ſerve with regard to the operations of covering and roping ſtacks.

Now,

Now, there is nothing, I imagine, that ought to be more ſtudied by the weſt country farmer, than to have by him at harveſt time, a good ſtock of old ſtraw; drawn, and ready for thatching his ſtacks, as ſoon as they are built. His rye-graſs, if he has any, comes early, yet affords him nothing to cover itſelf. His bog hay may ſpare him a few ſpritts and ruſhes for itſelf; and that is, perhaps, all that it will do; ſo that, if he can ſpare nothing here, the ryegraſs muſt ſtand uncovered till it is black, and perhaps rotten half a foot deep above the eaſing: for the end of our ſummers, and the beginning of our harveſt quarters, are our wetteſt times round the whole year. And as there is no poſſibility of our being provided, but from the ſpritts and ruſhes above-mentioned, againſt the harveſt itſelf: if there are no ſavings in theſe, every thing then put up muſt lie at the mercy of the weather, till it is provided by threſhing part of the crop itſelf: from this very circumſtance, I have ſeen peaſe ſtacks in the utmoſt danger of being wholly ſpoiled by great rains.

But to ſpeak preciſely to this point; it is not in a variable harveſt that the improvident farmer ſuffers moſt by want of thatch-ſtraw. This can only be felt in the very beginning of ſuch a ſeaſon; for bad weather gives the ſervants too much leiſure to provide whatever may be neceſſary. The want of thatch is commonly moſt hurtful in the very beſt harveſts. Then it is, that the farmer is hurried on with his work without; and truſting to the excellence of the weather, the preparation of thatch is delayed till all is gathered in, and all needing covering. If the farmer is not overtaken before that, he has reaſon to expect that it cannot be long after it; yet the long continuance of good weather tends to encreaſe his preſumption and ſecurity, and it is ten to one that he ſhall ſuffer at laſt: if he does, it muſt be moſt ſeverely. In paſſing a barn-yard, at Nether mains in Cuningham, ſometime about the end of October, in company with two country men, we obſerved a dozen good ſtacks all unthatched, and all as green

as

as a field in braird. We at firſt blamed the farmer's negligence; and one of the countrymen, to aggravate his fault, obſerved that he had no excuſe, for we had not for many years enjoyed ſo good a harveſt. The other, as I then thought, very judiciouſly checked him; alledging, that the goodneſs of the harveſt weather might be the ſole cauſe of the man's neglect. Upon reflection, the apology ſeemed to be juſt, as well as kind; for the fact was, that moſt of the corns had that year ripened together, and the fine weather continuing, every man was hurried in cutting down and gathering in. At the concluſion of the work a deluge of rain fell out, and the weather continued wet for ſeveral weeks. This farmer, indeed, like many others, was at laſt drove into his barn to provide his thatch; but, alas! he was alſo confined to it, till the growing took place; which hurt him much, as it did many others that year, who had been equally unprovident with himſelf.

Circumſtances of this kind occurring ſhould alarm the farmer, and guard him againſt an over-great confidence in the fineſt weather. It is a good maxim, Long foul, long fair; Long fair, long foul. At the ſame time, what is more directly to our point, all farmers, from ſuch occaſional ſurpriſes, ſhould be taught foreſight and diligence, in preſerving, or providing the neceſſary covering for their victual, when it can be got in ſafe.

Could not the farmer ſet apart all the ſtraw of late threſhed barley, for thatching next year's ſtacks? Perhaps it may be ſhortened a little; but no matter, it can be put on the cloſſer: for it will do, as we in the weſt ſeldom keep ſtacks over ſummer. We keep indeed too many cattle, which are partly ſtarved from want of both graſs and fodder. This cuſtom however makes us put a value on every ſtraw. My advice is, therefore, adapted to our taſte and cuſtom: for the ſtraw of ſeed bear comes generally after foddering time; beſides we eſteem it of little uſe for cattle, when threſhed earlier. For which reaſon, I am not even ſcrupulous of ſetting apart

for the enſuing harveſt, ſome of my earlieſt threſhed barley-ſtraw. For if I were not provided againſt the time of need, I ſhould think myſelf affronted if I had left a ruſh-buſh, or broom-know uncut, in all my poſſeſſion. It is true, ſuch as have large farms in the weſt are ſeldom unprovided; and in the eaſt, where they have corns of all kinds to threſh through ſummer, they ſcarce ever can be in want of thatch at harveſt time. And what, I pray, would the eaſt-country farmers ſay of our practice, did they know that few of thoſe in the weſt, have a ſingle ſheaf of laſt crop remaining, to put upon their ſtacks of the preſent crop; but that it muſt be threſhed out of itſelf, before the crop can be covered from the weather. Might they not aſk us, with all our oeconomy, What could be the difference, in providing our thatch from laſt crop, or from the preſent, ſince ſooner or latter every crop muſt furniſh the quantity required for a year? Might they not twit us with the old proverb, That ſince we will be ſaving, it is ſtill better to ſpare the braird than the bottom? for without knowing what a bad winter may require of us, we dip very deeply in that winter's proviſion, for the ſtraw that in harveſt is abſolutely neceſſary to ſecure the crop.

But in regard that, after all that can be ſaid upon the advantages of a proper foreſight and providence, with reſpect to our probable wants, many will be more or leſs unprovided when the demand comes upon them; our *1ſt* Rule here is, That great care be taken in the building of ſtacks, eſpecially above the eaſing, in order to keep out the rain till the thatch can be provided. This is done, as was hinted upon hutting, firſt, by filling the heart well, and thereby ſloping the outer ſheaves, ſo as to drain off the wetneſs readily. This is an eaſy work above the ring-gang, where it is moſt needful. Below that it is more difficult, eſpecially if the ſtack is allowed to grow much. Here the ſheaves on the outſide ſlide out, and both diſfigure the building, and endanger its falling without ſupporters. But a tight rope round the ſtack, and an active hand

hand below, to beat in a theaf as ſoon as it ſlides out of its place, is the effectual remedy.

It may be neceſſary to obſerve here what will ſometimes happen, to wit, that the building of a ſtack may be interrupted with rain, before it is half finiſhed; which is not only dangerous to the corn laid out upon the field for compleating it, but particularly ſo to the unfiniſhed ſtack. We paſs over at this time the danger in the field, as not to our preſent purpoſe; and only take notice, that the common preſervation uſed for a ſtack in this condition is, to fill up the heart as quickly as can be, with whatever corn is at hand, or on the way homewards. After this, the workman gives the whole a cloſs covering of thatch ſheaves, to keep out the rain. But as this kind of covering is not always ready on ſuch occaſions; ſo, at the ſame time, when it is uſed, it is but an inſufficient protection under great and continuing rains. It were therefore to be wiſhed, that we had in uſe both a better and more conſtant ſecurity.

I have heard that the farmers in Holland uſe a kind of timber roof, of a conic figure, for the heads of their ſtacks; which, being hung by the top upon a triangle, can, by the means of pulleys, be drawn up, or let down at pleaſure; as the weather may either favour, or obſtruct their work. Our countrymen who have ſeen them, call them Dutch barns: for the farmer can build up beneath them, any ſmall quantity of his corn which he finds ready at the time, and letting down his roof upon it, he can wait with patience till more of it can be got in. And this work he can repeat from time to time, till the ſtack is compleated, and the roof fixed down upon it for good.

This is the only account of thoſe timber roofs, which I can at preſent recollect; it being a long time ſince I heard of them. And as I never ſaw one, nor do I remember to have ſeen any deſcription of them in the books upon huſbandry, I dare ſcarce venture to be more particular myſelf, leſt I ſhould miſtake my own

own late conjectures, for the informations of my friend. Neither for the ſame reaſons, can I judge preciſely of their advantages or diſadvantages. One however may preſume, that thoſe who uſe them find ſome benefit from them. But whether the advantages of them are ſuperior, or rather additional, to what we enjoy from our own barns; or if they are only ſupplemental, in making up for the want of ſuch barns as we have, I cannot at preſent pretend to determine. In the mean time the difference between theſe two circumſtances is important. I ſhould therefore think, that the public would be indebted to any man better informed, for an accurate account of their conſtruction and advantages.

After all, if any of our farmers inclines to try his genius, upon the imperfect hints above given, he might uſe at a ſmall expence, the common fir of the country, both for his triangle and cover: and if he gave his ſtacks, and alſo the conic covers a ſquare form, the trouble and expence of the workmanſhip would be leſs, and the frame itſelf more firm than the circular form adapted to the common round figure of our ſtacks. If the farmer does not chuſe the triangle and pulleys, the cover muſt be made in ſuch pieces as can be put together with hands, when it is to be uſed. Or, if theſe pieces ſhould be too heavy, and in windy weather become unmanageable; the frame of them only might be made of wood, and be covered when uſed, with ſome coarſe wax-cloth, or oil-cloath, ſhaped for one ſide of the cone. And, if the top of the cone was preciſely a right angle, any two quarters put together by the baſe, would make a ſquare winno-cloath, when not in immediate uſe as a cover. The firſt of theſe with the triangle and pulleys will be the moſt manageable, if its expence does not affright the farmer. Laſtly, if the farmer pleaſes, a ſimple wax cloth could be ſhaped to that kind of head which any ſtack builder would chuſe to leave upon his work, were he like to be overtaken with rain. This could eaſily be thrown over it, and if a ſmall weight were appended to each corner, in order to

ſtretch

ſtretch the cloth properly, the rain would run off it more eaſily, and the wind might not be able to raiſe it from its place. Hearing that ſome of my ingenious neighbours were deliberating about theſe temporary coverings, I have thrown out the foregoing hints into their view, merely as materials for their own thoughts; hoping to hear ſoon of ſome contrivance that will remedy the inconveniencies of which they have complained theſe two years paſt.

2*dly*, The builder ſhould endeavour to lay all his outſide ſheaves ſo cloſe together, that no vacancy or even ſlackneſs be left in the whole round, to admit the rain. Above the eaſing it is common to ſpread the bottoms a little, by which their heads are kept more erect, and the vacancies below are better covered.

If before the thatch is prepared, the ſtack ſhall ſuffer from great rains, which threaten a continuance, and the farmer would wiſh to have it protected; inſtead of a cloſe thatching with ſtraw, I would in this caſe adviſe a broom covering, where it can be eaſily had. For, if the root ends of the branches were a little ſharpened, ſo that they could be eaſily thruſt into the ſtack, this work could be done at any time, without waiting till it was dried on the outſide: becauſe, whilſt the broom is a ſufficient protection againſt ſucceeding rains, it admits alſo a ſufficient quantity of air among its branches, to dry up the former wetneſs from the ſheave bottoms. I once ſaved a peaſe ſtack, by putting on this covering in the middle of a thunder ſhower, of ſome hours duration. The ſtack had been juſt put up when it began; it was therefore ſo looſe in its texture, that we were ſoon obliged to cover it with winnow cloths, leaſt the rain ſhould ſink into its center: and we only ventured at a time, to uncover half a yard breadth, immediately before the thatchers, till they could put on the brooom. Foreſeeing that I ſhould be ſcarce of thatch that year, (1753) I had for my own ſecurity brought home a fortnight before the danger a load of broom, from a place at two miles diſtance.

Had

Had I not been in poſſeſſion of it at the time mentioned, I might have wholly loſt my peaſe ſtack; for the weather continued wet and ſtormy for ſome time after. But as things happened, every ſheaf was preſerved; and that without any inconvenience, except a wet ſkin to the ſervants; and without any expence to the maſter, but a little of his dram bottle, which on ſuch occaſions ought not to be ſpared.

3*dly*, He ſhould take care to leave no riſings, nor hollows in the line of the thatch gang, that is, from the eaſing to the neck of the top ſheaf For theſe purpoſes, after the top ſheaf was put on, I have ſeen the ſtack-builder come down, and go round, to take a view of his work on all ſides; and then mounting his ladder, I have ſeen him give every part above the eaſing a little hand dreſſing; that is, pulling out the hollows, preſſing or beating in the riſings, filling up the vacant ſpaces, by ſpreading the bottoms of the neighbouring ſheaves; and laſtly, ſmoothing down the ſtarted pens of a ſheaf bottom, till he gave the whole the neatneſs of a well pulled hay-ſtack. This operation, the work of a few minutes, while a hood ſheaf or a couple of ropes were a-making below, hath, beſides its neatneſs, theſe two advantages; 1*ſt*, It needs leſs thatch; and 2*dly*, It will bear unhurt a conſiderable rain, till that little can be got and put on. Neither of which will be overlooked, under a weſtern ſcarcity, or in a weſtern climate.

Our ſecond rule in covering ſtacks, is, to do it by thatching. To ſhake on the ſtraw from the top of the ſtack, as is done in the eaſt, coſts perhaps leſs time. But it is neither neat nor workman like; nor is it ſo good a ſecurity in rainy weather, unleſs the quantity be greater than we could well ſpare: nor laſtly, can it be done to any purpoſe, but in a dead calm. At the ſame time, while we blame the eaſt country farmers in this particular, they are alſo intitled both to our apology and commendation. Their weather is ſo generally good, and their corns ſo generally clean at bottom, that they do not require the care which ours do. Beſides, they build

their

their ſtacks with ſo much more dexterity than we commonly do; that, with their other advantages of corn and climate, they need leſs covering, or leſs care in putting it on. I am ſtill, however, perſuaded, that thatching is much neater, and a better ſecurity in caſe of bad weather. Only obſerve, that in thatching ſtack, it is not proper to ſhorten the ſtoppel too much, by thruſting its head far into the ſtuff. Nor is it neceſſary to overlap greatly the heads of the under row, by the tails of that above it. The ſinking of the ſtacks through time, tends to overlap them more than at firſt they ſeemed to do; and likewiſe tends to faſten their heads, if they had any hold at all. At any rate, if they can be kept on till the croſs ropes are laid over them, theſe will keep them firm, though they had little other faſtening.

After the thatch is put on, the next operation is to keep it on with ropes. Before we ſay any thing to this point, we would obſerve, that as the beſt ſtack ropes are made of ſpritts, and other coarſe ſtuff drawn out of bog hay, ſuch as have this convenience, ſhould provide themſelves in time. The ſpritts ſhould be drawn from the hay when it lies in the ſwath; and being tied up in ſheaves, they ſhould be ſet up ſingle to dry; and when ſufficiently win, ſhould be kept in a dry place till needed. If this proviſion has been neglected, ſmall oats may be threſhed out to ſupply their place. I muſt however blame a want of attention and foreſight, in ſecuring even this trifling convenience, in a time of more leiſure. Hours are ſometimes loſt in dewy mornings, before hay can be turned or ſpread out. It would be profitable, if ſuch times were employed in drawing out the ſpritts and ruſhes, from the finer graſs, for the purpoſes above-mentioned; and the cattle would have more pleaſure in eating the remainder.

The firſt thing to be done towards the roping of ſtacks is, to put on ſo many upright ropes as are neceſſary to divide the ſtack properly. A ſtack may be quartered, by two ropes put round

round the neck of the hooding by the middle, and having their ends faſtened below the eaſing. Theſe ſerve to keep the hooding firm, and are put on before thatching. After the ſtack is thatched, theſe upright ropes ſerve, as a kind of warp, upon which a number of croſs ropes that lie horizontally are wrought, in order to keep the thatch firm and cloſs. If the ſtack is large, three or four ſuch upright ropes may be put on it, in proportion to its bulk. This done, the workman faſtens his circular ropes to one of the upright ropes, making uſe of his ſhorteſt neareſt the top. Theſe he carries round the ſtack, putting them about each of the upright ropes, in order to keep both firm in their places; and before he ſhifts his ladder, he ſtrokes down the thatch that may be raiſed by the wind, or ruſled by his work, that every part of it may lie neat and ſtraight, when it is left. But in regard that the frequent ſhifting of the ladder, and the carrying it often round the ſtack, is both tedious and labourious, the farmer takes care, *1ſt*, That his upright ropes be not at ſo great a diſtance from each other; but that he can reach from one to another, without coming down to ſhift his ladder. *2dly*, He faſtens as many of his croſs ropes at once as will finiſh the whole, at equal diſtances between the hood-ſheaf and eaſing, that he may carry all of them about with him together, and ſo compleat the work in one round of the ladder; which makes a great ſaving both of time and labour. When this work is done properly, the ropes reſemble a kind of net-work in one piece, which ſinks equally down together, as the ſtack itſelf ſubſides. And if at a fortnight's diſtance the upright ropes were drawn gently downward, ſo as they could be ſtraitened a little by a new faſtening below, every inch of the circular ropes would lie cloſs to the thatch, and keep it on firmly. The ſame ſtraitening of the upright ropes may be repeated as there ſhall afterwards be occaſion. The neateſt way of faſtening them below the eaſing is, by tying them to a ſtrong circular rope placed there.

Of

Of the means of recovering heated Corns, either in mow or ſtack; and the proviſion that may be made for rendering this an eaſy work.

Though what hath been already ſaid upon the methods of keeping ſtuff cool, in ſtack or mow, be a ſufficient ſecurity to the farmer, if he will be inſtructed; yet in regard all are not provided with the conveniencies recommended, and many never will provide themſelves with any of them, chuſing rather to follow the beaten road, even though they ſhould mark themſelves out by their own ill ſucceſs and diſappointments. In regard alſo that, however negligent and confident ſuch farmers may be, bad ſeaſons will happen, corns will be ſpoiled both in ſtacks and mows, and loſſes and misfortunes will be the conſequences to themſelves, and to the public; compaſſion to both inclines me to add a fourth particular to what is ſaid above.

It relates to the means of cooling, and recovering ſuch ſtuff as is begun to heat, and in danger of ſpoiling, &c.

This calamity was remarkably the caſe in the high grounds laſt harveſt (1772). The long continuance of the froſt had deferred the plowing till near the end of March; the ſeaſon afterwards being cold and late, and the muir lands being naturally ſo, all things ſeemed to concur in making the harveſt very late alſo; and, therefore, peculiarly dangerous to graſſy corns; eſpecially conſidering the long continued wet weather in that ſeaſon.

The common practice, when a barn mow heats, is, to throw it down betwixt the open doors, and letting it lie there till it cools, and can be put up again in its place. And when one can ſpare the room ſo long as it is needed, the work is eaſy; and, with a little patience and diſcretion, the cure may be effectual. But, alas! in dangerous weather our barns are commonly ſo crammed up, that there is either no room left at all; or the little that is, may be allotted for ſome bit of a field

not yet under cover; and perhaps in as much hazard without, as that within ſeems to be. If this remedy ſhould fail us, the next in common uſe is, to carry the heated corn out into the barn-yard and adjacent fields; where it muſt be ſet up, and ſtand till it is ſufficiently cooled and aired. It is eaſy to ſee, that this cannot be done without a conſiderable expence, both of grain and labour; and that every probable mean ſhould be tried, before it is done. And would men be but perſuaded by any arguments to think and provide before hand, ſuch a picture of diſtreſs could be exhibited upon thoſe dangers, as would excite any mind, a degree above ſtupidity itſelf. Suppoſe, for example, the back mow were heated, as well as the foremoſt, that the ſtacks in the barn-yard were ſuffering by the ſame misfortune: ſuppoſe the weather ſo bad that none of them could be touched; and when a tolerable day came, ſuppoſe the ſtuff without were needing ſuch aſſiſtance, that the farmer could not reſolve which he ſhould begin to: ſuppoſe him ſufficiently aſſured of the loſs he muſt ſuſtain, by taking down, handling, and again putting up his corns; ſufficiently apprized of his danger from a change of weather, and ſcarce daring to truſt any thing abroad for fear of it. And yet under all thoſe inconveniencies, contemplate him drove on by dire neceſſity, to undo all his former labours, to renew an expence already incurred, to expoſe himſelf to hazards from which he had but lately eſcaped, and to ſuffer the undoubted loſs of what he thought perfectly ſafe. Contemplate the farmer in this ſituation, and endeavour to conceive what his perplexity, diſtraction, and regret muſt be. Aſk him, what he would then give to have been at proper pains, with his barn, and barn-yard, in order to have effectually prevented his preſent diſtreſs and inconvenience? I dare ſay there are few of you, who in this perplexed ſituation, would not give more money than what, if well beſtowed, according to the above directions, would have afforded a ſufficient ſecurity, or an adequate remedy. I would willingly put theſe matters in

a ſtrong light to you, becauſe it is in the immediate feeling of ſuch diſtreſſes, or in the ſtrong impreſſion that can be made of them upon the mind, that one can know the value of a perfect ſecurity, or certain remedy. For when danger is over, we ſoon forget it, and therefore incline to baniſh the fears of it; and with them all the care that may be neceſſary to provide for it, againſt the time to come. In ſhort, we never think of paſt danger, till we are involved in a freſh one; and therefore are as unprepared for the laſt, as we were for the firſt.

In the mean time, not to detain you too long upon an argument, that like all other remedies may be unpleaſant, while highly neceſſary and ſalutary; allow me to obſerve, that if it be extremely troubleſome to carry out our heated corns into the freſh air, it is not very difficult to carry the freſh air into the heated corn, did you once underſtand how it ſhould be done.

Amongſt the reſt that ſuffered by heated corn in the year 1772, my old acquaintance Thomas Orr was one: not indeed in his ſtack-yard, for that was ſufficiently ſecured by the logies and funnels above deſcribed; it was in his barn, for which he was not ſo well provided. But, even there, did his foreſight and ingenuity fail him? No; Thomas may be in danger, but is not ſo often overtaken by it as ſome others. Let us hear then his own account of the matter; for his ſcheme ſeemed moſt ingenious, and was in every ſtep of it well digeſted and prepared. Thomas ſuſpected his barn from the beginning, for he had eyes to ſee it, and was not diſpoſed to diſguiſe it to himſelf, under any fallacious hopes. Therefore, though he could not mend the matter at that time, in the midſt of very bad weather, he took every ſtep, that a wiſe man could take, to ſecure himſelf afterwards. Having an open ſlit in the wall, near the top of his gavel, in building his new upon it, he uſed the following precautions. Firſt, He ſet one ſtale above another, and ſo had his corn, eſpecially in the middle, ſtanding all on one end; even at the ſides, and upon the

front

front of his mow, he ſtudied to give every ſheaf ſuch a ſlope, as pointed them all, as much as he conveniently could, towards the above-mentioned ſlit, or opening. For he reaſoned juſtly, that when his mow heated, the warm air, as it aſcended, would naturally take along the line of his ſtraw, towards the ſame place, and ſo get out by the vent hole. Thomas, however, did not wholly depend upon the building of his mow, though his method was rational and had been recommended by others. He knew he had hazarded much, as all his neighbours had done; he therefore prepared himſelf for the worſt; for he made uſe of all the ordinary means of knowing the real ſtate of his mow, that is, by thruſting in at different places, four or five hand-ſtaves, and by pulling them out at different times, he was able to judge by their warmth in his hand, where the heat was greateſt, and what progreſs it was daily making. Finding, by theſe trials, that the heat was actually begun, he then took an old gun-barrel, and being a ſmith to his trade, he unſcrewed the dock, and took it out altogether. He next ſhaped for the muzzle a few wooden pins, with ſhoulders upon each, that they might not go too far into the barrel, nor ſtick too faſt in it; and theſe pins he ſharpened to a point at their outer end. His deſign by their points was, to thruſt the whole gun-barrel with eaſe into the mow, as far as he thought neceſſary: and then by drawing it a little backward, he thought that the ſhoulders of the pins, by taking hold of the croſs ſtraws, would aſſiſt him in diſlodging them from the muzzle, and ſo leave it quite open, for the outer air to paſs freely through it, into the heart of the mow. Here again his reaſoning was at leaſt ſpecious: *viz.* That if the gun-barrel wanted altogether the pointed pins, the ends of the ſtraw would get into its muzzle when thruſt inward, and either cork it up wholly, or by their reſiſtance prevent its entrance, without a very great force. And on the other hand, if the pins wanted the ſhoulder, they might either go too far into the barrel, and ſtick too faſt in it, or even be

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otherwiſe difficult to diſlodge. Laſt of all, Thomas having ready in his houſe a ſmall pair of hand-bellows in order to throw in the freſh air through the barrel, whenever he ſhould find it neceſſary; he thought himſelf prepared for the worſt, and therefore patiently waited till the mow was ſufficiently heated, that ſo the effects of his preparations might be perfectly aſcertained. Accordingly, in a few days, when the neighbours had begun to caſt out their heated corns, Thomas drew ſome of his hand-ſtaves, to ſee in what condition his own was; and finding their warmth ſo great, that he could ſcarce hold in his hand the end of his poles, he inſtantly began his operations. So, fixing one of his wooden pins into the muzzle, he thruſt his barrel into the hotteſt of his corn; then drawing it a little outwards, to diſengage the wood, he rolled a little tow round the noſe of the bellows, and twiſting it firmly into the dock end of the barrel, that no air might return that way, he began to blow: and, in one word, he continued blowing, till by drawing one of his neareſt hand-ſtaves, he could feel the inner part of it perfectly cooled. This encouraging his hopes, he drew the barrel from that place; and quickly filling the muzzle with another pin like the former, he thruſt all into another part of the mow, at ſome diſtance from his firſt hole; and blowing as before, he continued till he was again ſatisfied. And thus, by repeating theſe operations again and again, in different places, he was in two hours time, perfectly convinced of his ſucceſs. For all his poles and hand ſtaves being quite cold and dry, he was ſenſible that all the moiſt and warm vapour was fled. What indeed contributed a little to Thomas's conviction, and perhaps not a little to his ſatisfaction, was a viſit made him by one of his neighbours, during the courſe of his foregoing operations. This man, either informed of Thomas's deſign, or ſuſpecting ſome contrivance going on within, as he ſaw nothing going on without, that was neighbour-like, came to his barn; and obſerving as he paſt the end of it, that the fare, or ſteam of the

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vapour, was coming out from the ſlit-hole in the gavel, like the ſmoke of kiln-drying, he told Thomas at entering, that if he had not ſuſpected what he was about, he would have imagined that he had laid ten bolls of corn upon a kiln-head within, and had put a good fire to the tail of it. Since the foregoing operations a more effectual experiment has been made upon the mow. It has been all threſhed out for uſe, and the owner declares to me, that he never had any in better condition than it was. Thomas, by way of anſwer to ſome compliment made upon his ingenuity, tells me that he is no wiſer than his neighbours; but that he juſt thinks a little what he is going about, and how it ſhould be done. If they would but think a wee, he does not doubt but many of them would contrive things better than he.—Is not his ſentiment both modeſt and juſt,—is it not full of inſtruction? It is: for what is wanting to rational creatures, in the management of their ordinary affairs, but thought, or the exerciſe of their rational faculties about them?

Such was the ſucceſs of Thomas Orr's ingenious contrivance, all executed with his own hand, and the full effect of it ſeen in two hours or ſo. This no doubt ought to enhance its value, and recommend the trial to others. Indeed the whole of it ſeemed to me, from the beginning, to be planned out upon ſuch ſolid principles of reaſon, and ſuch an accurate attention to circumſtances, as could ſcarce fail of its effect. I have therefore always encouraged Thomas to ſuch trials; and ſcarce ever had occaſion to correct him, if it was not with reſpect to ſome of the properties of air, which Thomas could not be ſuppoſed to know. I mean the effects of heat in rarifying it, and the effects of a vacuum occaſioned by rarifaction, in attracting the external cold air. But having already explained ourſelves on theſe points, pages 573. and 574. we ſhall not enlarge upon them here. One however, from all that has been ſaid, may ſafely adviſe farmers in one ſingle word, that if their barns and barn-yards are not accommodated with ſome of thoſe

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proviſions recommended on the ſecond head of this period, they ſhould at leaſt in threatening harveſts provide themſelves with a hand-bellows and a gun-barrel. If one has not a hand-bellows, a little more time might anſwer all its purpoſes. Or, if the gun-barrel be not at hand, a ſtick could be bored, or a ſmall rhone could be made, that could be laid in, and corked up, till the time required its uſe; or it could be thruſt in afterwards, wherever it was found needful. Theſe are portable conveniencies: they can be carried out into the barn-yard, and applied with equal ſucceſs to a heated ſtack, as to a heated mow. And if a wiſe man can by any ſuch trifling conveniencies, extricate himſelf from the dangers and difficulties abovementioned, or relieve himſelf from the labours and perplexities there deſcribed, they are ſurely worth a little of his attention and care.

Few men have however imitated, or even hearkened to my friend Thomas, though he may be ſaid to have both ſought and found out many uſeful inventions. Thomas has plowed his land theſe ten years paſt, with two old mares, and a plow of his own contrivance, long before we got the Merſe, or Northumberland chain plow into this corner. He has often defied his neighbours to make better work, or to produce better corn upon the like grounds; yet I know not if, as yet, one man has tried the like, though he can have the wood, the iron, and workmanſhip at half the ordinary price. He is indeed a philoſopher from native reflexion, and the powers of genius; yet the ſimplicity of his looks, and aukwardneſs of his air, are too much againſt him, to gain him any general credit or leading with the bulk of men. It is too much the diſpoſition of human nature to contemn alike, (if not more) what is above their comprehenſion, as what is below it. Hence all blockheads are the moſt cenſorious of ingenious men and meaſures; being ſcarce able to approve any thing, but what is perfectly vulgar, and beneath all notice. A fool is wiſer in his own conceit, than ten men that can render a reaſon. Beſides,

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ſloth and inactivity hurt many, that are neither ſtupid nor incapable. Hence men will ſtruggle through the whole of life, with yearly, nay, with daily inconveniencies and difficulties rather than beſtow one day's labour, or the price of it, to relieve themſelves from them for ever. Pride too, an high opinion of ourſelves, and a ſcornful contempt of others; a prejudice alſo againſt new cuſtoms, and a bigotted attachment to old ones; all of them conſpire againſt inſtruction and improvement. Theſe have got into our worldly employments, as well as our religious concerns; and equally obſtruct the intereſts of this life, as they do thoſe of the life to come. Laſt of all, men who, animated by rivalſhips and interferings, will fight the world for a diſputed intereſt, and reckon themſelves capitally injured if they loſe it, will yet neglect a thouſand opportunities, by each of which, if duly improved, ten times the value may be ſaved or gained, The gradual improvements of an age, which are the gifts of providence, and the ſources of public eaſe and opulence, thoſe narrow minded and narrow hearted men will deſpiſe; wrapt up in their own indolence, ignorance, and ſelf-ſufficiency, they will ſcarce pull their hands from their boſoms, to receive the offered bounty, that could make them rich or eaſy, wiſe or happy. None but the wiſe can be made much wiſer; for to him only that hath ſhall be given. Hence it is, that improvements of every kind, even thoſe of ſaving and œconomy, the moſt obvious of any, go on but ſlowly; and inſtead of encouragement, meet with neglect, or oppoſition, from the far greateſt number of mankind.

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ARTICLE LXXV.

Account of an unſucceſsful Experiment of watering new ſprung Clover with Salt Water.

[In a letter from ARATOR to the Editor.]

HAVING juſt a few minutes leiſure, and being returned from the plough, by which I have been buſy horſe-hoeing ſome turnips, I deſign to write you a ſhort letter, concerning an experiment which I made laſt year, with ſea-water, as a manure for young graſs; and as there is no neceſſity for a long winded preamble, I ſhall introduce the ſubject of it, without ſo much as mentioning the propriety of communicating the reſult of an experiment, which can be of no ſervice to others, but ſo far as it may caution them, againſt making the ſame trial to a great extent, and conſequently prevent them acquiring the ſame knowledge at a much dearer rate.

Late in the ſpring of the year 1772, I ſowed ſome clover-ſeed. It ſoon vegetated and aſſumed a very good appearance; retained its lively colour, and was in a very thriving way in the month of Auguſt, when the water was applyed. Upon the 19th and 21ſt of that month, the water was applyed in much the ſame quantitys, as are uſually poured upon thirſty plants, to ſupply the want of rain. At this time it was calm, ſoft, rainy weather, and, without doubt, the moſt proper ſeaſon for applying ſalts; but the bad effects of the water were diſcovered in a ſhort time. In a few days the plants were viſibly in a decayed ſtate, at laſt they entirely diſappeared, while the part of the field unwatered continued freſh and good. That corroſive, notwithſtanding the freſh water, which doubtleſs muſt be an antidote againſt its more violent and ſudden effects, thus deſtroyed, without the ſmalleſt exception, every plant upon which it had been poured, in the ſpace of

two weeks. Sea-ware produces the ſame effect in proportion to the ſalts it contains; but there is not a more proper manure for graſs, any time after it has been once cut, than this is, if layed on in a wet ſeaſon. I am, Sir,

Eaſt-Lothian, Yours, &c.
Auguſt 16th, 1773. ARATOR.

ARTICLE LXXVI.

An apology in behalf of Crows; in anſwer to Arator's *Letter,* N° VII. p. 347.—*A receipt for killing Mice.*

[In a Letter to the Editor.]

I See in the Scots Farmer (N° VII. p. 347.) a paper upon the deſtruction of Crows. If by Crows is meant Rooks, before a general aſſociation take place for their deſtruction, I humbly conceive the public ſhould have under their conſideration the following paſſage from Mr Pennant's Britiſh Zoology, vol. I. page 168. 'But what diſtinguiſhes the rook 'from the crow is the bill; the noſtrils, chin, and ſides of 'that and the mouth being in old birds white and bared of 'feathers, by often thruſting the bill into the ground in ſearch 'of the *erucæ* of the Dor-beetle: the rook then, inſtead of be-'ing preſcribed, ſhould be treated as the farmers friend; as it 'clears his ground from catterpillers, that do incredible da-'mage by eating the roots of the corn.' I the rather mention this, as many acres of corn in Banff and Aberdeen ſhires have been this year deſtroyed by the tory worm, which I take to be the Larva or the Dor-beetle; *Scarabæus Melolantha, Lin. ſyſt.* 351. The oeconomy of nature and divine providence is not well underſtood; and the relations, dependencies, and connections of things too little ſtudied; but when known we ſhould make a proper uſe of ſuch knowledge; and, in this caſe, it is at leaſt a queſtion, whether the rook does not greatly more ſervice to man by the deſtruction of an infinite number

ber of pernicious inſects, (which we ſee them every day digging for, and of which they were created to diminiſh the numbers by feeding on them) than they do hurt in ſeed time and harveſt, by feeding on corn. Even the raven, royſton or hooded crow, and magpie, are very probably more uſeful in the conſumption of carrion and deſtruction of inſects, than hurtful by ſometimes picking up a few chickens or lambs. Though the mole be apparently hurtful in gardens and meadows, yet I have ſometimes thought her of conſiderable uſe in ſtirring and pulveriſing the ground, and eating up inſects. I would not however be thought an advocate for mice and rats; and wiſh ſome of your correſpondents would give us ſome good methods of deſtroying them: Meantime, I beg leave to mention a receipt for killing mice, to be found in the Britiſh Zoology, vol. I. p. 106. which not being in many hands, may be worth publication in your collection. Mr Pennant aſſures us, 'That the 'root of white hellebore, and ſtaves-acre, powdered and mix-'ed with meal, is a certain poiſon to them.' I am, Sir,

Auguſt 17th, 1773. Your moſt obedient ſervant, RUSTICUS F—S.

ARTICLE LXXVII.

The whole proceſs of the Turnip management in Eaſt-Lothian. —Scheme for the encouragement of propagation.

[In a letter to the Editor.]

ENcouraged by the example of others, I hereby attempt to enter myſelf into the liſt of your correſpondents, who have already generouſly contributed their ſhare, to the ſupport of the SCOTS FARMER. I poſſeſs no ſhining talents to make me appear conſpicuous in the literary world; can boaſt of no qualifications calculated to pleaſe the admirers of language, and of that melodious combination of ſyllables peculiar to the learned; but I can deduce the moſt natural and obvious conſequences

ſequences from a ſhort train of ſimple facts, and tranſcribe them into plain and ſimple ſtile, which I think qualifies me for making obſervations in the farming way, and conſequently for becoming (with all due deference to your better judgment, Mr Printer) one of your correſpondents.

I intend, in this place, only to mention the moſt common method of managing the turnip in Eaſt-Lothian, as you propoſe in your introduction [p. 6.] a reciprocal communication of the reſpective practices of the different countys in Scotland, as a mean of improving the languid ſtate of our agriculture.

We raiſe our turnip then upon fallow-ground prepared in the beſt manner. It is ploughed before or in winter, in the uſual way, and in the ſpring and ſummer, as if intended for barley. The intention of plowing is generally known. To kill the couch or quickening graſs, and ſeeds of annuals, and expoſe the earth to attract the food of plants, are obviouſly the chief deſigns of it; all of which naturally point out the proper time of uſing both the plough and harrow, [N° III. p. 122.] and therefore, it is unneceſſary to dwell upon that head. We commonly reckon the laſt week of June or firſt of July the moſt proper ſeaſon for ſowing them; but, on account of the drought, it is often neceſſary to embrace an earlier opportunity, or wait a later one; as ſowing without this precaution, endangers the whole ſeed: This indeed is running no great hazard if we count but the value of the ſeed, as we buy it commonly at 6 *d per* lib. But, beſides the extraordinary attention paid to that plowing and harrowing beſtowed upon the turnip, a ſcheme laid with accuracy and deliberation being thwarted by careleſſneſs in the execution of any particular part of it, muſt doubtleſs be a material loſs.

About the middle of May, after the field has been croſs-plowed and harrowed, it is turned into ſmall ridges at the diſcretion of the farmer; in general they are three foot wide. They remain in this ſituation till a proper ſeaſon preſents itſelf for the ſeeds being ſown, or near it; in the mean time the land

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is covered with the manure deſtined to that purpoſe. At the ſeaſon for ſowing, the ſmall ridges are plowed, but their order inverted, i. e. they are cleaved out, and the crowns changed into furrows, and the furrows into crowns. By this means it is evident that the dung, equally ſcattered upon the ſurface, is tumbled into the old furrows, and conſequently into the new crowns, where the turnip is always ſown: hence have they the richeſt part of the field to paſture in, and the dung too leſs expoſed to the ſun, by the plough in hoeing them. It is ſometimes made a queſtion, Whether it would be moſt proper to apply the dung immediately to the barley after the turnips, or in this way; but it depends upon circumſtances which the farmer alone muſt judge of. His ſituation for the reſpective markets of corn and beef; the quality and condition of his land; the ſtate of his manure, and perhaps other circumſtances unnoticed, muſt determine him in this point. Corn without doubt is the commodity moſt worthy the farmers notice in this country, but he reckons his land in as good condition for carrying a crop of barley, even after the dung is a little exhauſted by the frequent plowings neceſſary to the turnips, as when it exerts itſelf with ſuch vigour as to endanger its being ſloomy. Some pretend to ſay they loſe nothing of their dung, by applying it to turnip; but this is plainly falſe. Every plant that thrives better with, than without dung, undoubtedly takes from the value of that vegetable food, reſtored to the land by the dung, and it loſes too by exhalation. If the land is tolerably rich, and has been very often and well plowed, we will ſometimes raiſe the turnip entirely without dung, and they will do wonderfully well. In this caſe the farmers near the ſea-ſhore have often the good fortune of ſea-ware to ſupply its place, and it does exceedingly well; but there is no plant to which he can apply this manure with greater ſucceſs than the cabbage.——After ſowing the turnip, which he does by a drill-plough of a very ſimple form, the farmer obſerves ſtrictly, and hoes them as ſoon as they are quite

diſtinguiſhable

diſtinguiſhable from the weeds; he hoes at this time only along each ſide the row, but does not thin them till conſiderably ſtronger, and this hoeing is only cutting out about the hoes length, making blanks, and leaving ſome plants together, alternately. At this time, if the annuals are brearded, he horſehoes them by plowing the earth away from the turnip, and when they are ſufficiently thinned with the hand, which is not done till they are ſtrong enough to ſtand ſingle, about which time he reverſes the former plowing by throwing the earth back again to their roots. Thus he concludes his ſummers labour among his turnips, which requires a conſiderable number of hands, if he deals extenſively in that article.

This by the bye ſuggeſts to me a ſcheme of my own, for the encouragement of the propagation of uſeful hands for this and other valuable purpoſes in the field buſineſs, which I had occaſion to mention, and ſhow the propriety of, to a company which I was in lately. I told them, that in order to this noble end, I had eſtabliſhed it, and was determined to make it a fixed practice, that any hind lawfully married, ſettling under me, ſhould receive, for every child which he has by his wife, a firlot of wheat, with the addition of a bottle of brandy at the inlying. This had almoſt ſhared the fate of every new ſcheme in our way, when I made it appear, upon the moſt rational principles, that it actually produced the deſired effect. "Any thing," ſaid I, "that has a tendency to overcome the weary load of po-"verty, and lighten the iron hand of affliction, the neceſſary "conſequence of it, muſt certainly add new ſtrength and vigour "to thoſe whom it generouſly relieves, and therefore, gentle-"men *.——" but the conſequence is ſo plain that I need not repeat it to you, MR AULD. I ſhould

* No ſooner did I attempt to draw the neceſſary concluſions from my eſtabliſhed data, than they unanimouſly agreed to what I had ſaid, and that the ſcheme was well worthy of being communicated through the channel of the Scots Farmer, ſince it was worthy the imitation of every huſbandman.

I ſhould here go on to mention the manner of feeding both ſheep and cattle with turnips; but as my letter is already by much too long, I ſhall refer that part of it till another epiſtle, when I may probably make a calculation, both of the profit and expence ariſing from the turnip ſcheme under the moſt favourable circumſtances, to make it appear well worthy the attention of farmers who are in poſſeſſion of lands adapted to that purpoſe. I am, Sir,

Eaſt-Lothian, Your moſt humble ſervant,

September 10*th*, 1773. W——

ARTICLE LXXVIII.

On the culture of Turnips in the County of Eſſex.

[Muſeum Ruſticum, Vol. I.]

AS there never was a greater improvement in agriculture than the practice of ſowing turnips as food for cattle, I ſhall give you, for the public benefit, a few maxims, which perhaps may be of ſervice; and the more ſo, as I know them to be both uſeful and profitable.

Land cannot be brought into too good tilth for ſowing turnips: they require a deep, looſe, well-wrought mould *; and

* Mr Miller obſerves, that the ſoil propereſt for turnips is a tight, ſandy, loamy earth, not rich; for in a rich ſoil they grow rank, and are ſticky; but if the ſoil is moiſt, they will thrive better in ſummer, eſpecially in freſh land, where they are always ſweeter than upon an old worn out, or a rich ſoil. He ſays he has ſeen the roots of the green-topped turnip, which were more than a foot diameter, boiled, and were as ſweet and tender as any of the ſmalleſt roots. This we readily believe, as having often eat this large field-turnip in the country, and it always proved ſweet and good. They do not, in general, grow ſo large as thoſe Mr Miller mentions. That turnips are ſweeteſt on undreſſed freſh land, is an undoubted fact; yet will they thrive extremely well on rich manured land, and be very proper for fatting cattle, though not perhaps

and to effect this, diſcreet plowing and harrowing is the beſt way. I ſay diſcreet; becauſe one plowing, properly timed, is worth three that are out of time. It is a maxim in huſbandry, that ſome land cannot be plowed too much; but we ſhould add, at proper ſeaſons and intervals, or an ignorant farmer might ruin himſelf, and yet think he had followed the directions that were given him.

A light land requires leſs plowing, as well as leſs nicety in the times of plowing, than a ſtiff heavy ſoil; and it is alſo ſooner brought into good tilth: two well-timed plowings will often do it; whereas a clayey ſoil will require three or four, before it is brought into order.

An early plowing will greatly forward the getting a ſtiff ſoil into order: the month of April ſhould be the lateſt that ſuch, when intended for turnips, ſhould be turned up. It may then lie till the beginning of June, when it ſhould be harrowed down with loaded harrows to break the clods, and immediately croſs-plowed: about a fortnight after this it ſhould be plowed for the laſt time, and immediately croſs-harrowed and ſowed out of hand with the turnip-ſeed pretty thick, and ſcratched with a light harrow to cover the ſeed.

Light lands, as I ſaid before, may do very well with two plowings, one in the ſpring, and the other juſt before ſowing at Midſummer †.

I look upon it, that turnip-ſeed cannot well be ſown too thick, for it ſeldom all comes up, and, of what does get above ground,

perhaps quite ſo good for the table: this ſcores of farmers in Norfolk and Suffolk can teſtify; for where ſo many turnips are annually ſown, were they ever ſo nice, it would be impoſſible to find freſh land for every crop. Fortunately there is little occaſion for this nicety.

† The common ſeaſon for ſowing turnips, ſays Mr Miller, is any time from the beginning of June, to the middle of Auguſt, or a little later; though it is not adviſeable to ſow them much after, becauſe if the Autumn ſhould not prove very mild, they will not have time to apple before winter: nor will the roots of thoſe which are ſown after the middle of July grow very large, unleſs the froſt keeps off long in autumn.

ground, much is often deſtroyed by the fly, and ſlug; ſo that the plants ſometimes, though the ſeed was ſowed thick, require but little thinning by the hoe. In fact, I think it better at firſt to beſtow an additional quantity of ſeed, than to have to ſow two or three times over, as I have been often obliged to do, till I practiſed this method of ſowing thick, which generally ſucceeds very well with me *.

The beginning of July is the time in which I for the moſt part ſow my turnip-ſeed: in this matter the grand affair is to hit it off, ſo that the turnips do not grow ſticky or ſpongy before the winter, and yet are forward enough in their growth to reſiſt the froſts, &c. and be fit food for the cattle in the winter, or in the ſpring.

To have a good and profitable crop of turnips, it is abſolutely neceſſary they ſhould, at proper times, be hoed, not only to kill the weeds, but alſo to thin the plants, and ſet them out at a proper diſtance.

The proper time for the firſt hoeing, is when they have put forth their fourth leaf, and the ſecond hoeing ſhould be in about three weeks afterwards: twice is, in general, enough, unleſs a very following rainy ſeaſon ſhould come on, when it will be proper to take the advantage of the firſt fine ſun-ſhine weather, to give them a third hoeing: this, indeed, is often neglected, but I always found it pay well, by the thriving condition it put my crop in †.

As

* The quantity of ſeed generally allowed for an acre is one pound; but we think our correſpondent's method worthy of being recommended, and that two pounds, at leaſt, ſhould be ſown, and this the ſooner, as it is a cheap ſeed: it is an eaſy matter to hoe up the ſupernumerary plants, if they all come up and eſcape the fly,

† The chief advantage of this third hoeing was probably derived from ſtirring the earth about the roots of the plants, which, conſequently, gave them a greater facility of extracting the nouriſhment neceſſary for their growth, from the earth. As to the weeds, after two good hoeings the turnips will generally have over-topped them.

As to the diſtance at which the plants ſhould ſtand one from the other, that muſt be regulated by the ſize of the turnip; but it ſhould be never leſs than one foot, nor is there occaſion for its being more than two: about ſixteen or eighteen inches is a proper diſtance for the common turnip we generally ſow about me ‡.

If the ſoil, on which the turnips grow, is light and dry, the moſt profitable way is to feed your ſheep on them in the ſpot where they grew; but if the ſoil is heavy and ſtiff, it is beſt to have them pulled, and carried in tumbrils on to ſome dry paſture, or on any dry field you want to mend; for was you to feed them on the land, one half of them, at leaſt, would be rolled in the dirt, trodden under foot, and ſpoiled.

Land cannot be too rich, or too well dunged, for bearing turnips ‖; and this will bring them forward, and make them eſcape the fly better; for when once the leaves become rough, the fly does not chuſe to touch them: it is therefore certainly beſt to encourage them in their growth, and bring them as ſoon as poſſible out of danger.

When my young crop of turnips have come up, and I have been fearful of the fly, I have frequently ſown over them wood aſhes, and ſometimes ſoot §: theſe have been of great ſervice, eſpecially

‡ It is a great fault to leave the turnip plants too cloſe at hoeing: the diſtance will, as our correſpondent obſerves, depend on the kind of turnip; but a great deal will alſo, in this matter, depend on the nature and quality of the ſoil: if it is very rich light land, the turnips will grow to an amazing ſize, and the plants ſhould, in that caſe, be left at near two feet diſtance: if on the contrary, the ſoil is ſtiff and poor, the turnips will be but ſmall, and the plants may be left at about a foot aſunder.

‖ This is the Norfolk maxim; but Mr Miller thinks freſh unmanured land is beſt.

§ Mr Miller obſerves that there have been many receipts for preventing the fly taking turnips, but that few of them deſerve notice. He mentions, however, two or three which he had tried with ſucceſs. The firſt was ſteeping the ſeeds in water with flower of brimeſtone mixed, ſo as

eſpecially if gentle rains followed, as neither the flies nor ſlugs choſe afterwards to touch them. But I muſt obſerve, that this is no ſafe remedy, if the weather is dry and hot, for aſhes being of a hot nature, will then be apt to burn up the crop.

As to the ſlugs, the beſt way of deſtroying them in dry weather is with a light roller: this cruſhes and kills them, and does the crop ſervice, eſpecially if it is light land; for it preſſes the particles cloſſer, ſo that the moiſture in the earth is not ſo ſoon exhaled by the heat of the ſun; conſequently, the young turnips do not ſo ſoon ſuffer by a continued drought *.

It is ſcarcely neceſſary to obſerve that dry weather is beſt for hoeing turnips in, as then neither the weeds nor the turnips that are cut up are apt to grow again.

In light gravelly or ſandy ſoils, the ſeed of turnips may be deeper covered than in ſtiff clayey land: in the firſt, it may be pretty

as to make ſtrong of the brimeſtone; another was ſteeping it in water, with a quantity of the juice of horſe-aloes mixed; both which have been found of uſe. He adds, that the ſowing of ſoot, or tobacco-duſt, over the young plants, as ſoon as they appear above ground, has alſo been found very ſerviceable: in ſhort, whatever will add vigour to the young plants will prevent their being deſtroyed by the fly, for theſe never attack them till they are ſtinted in their growth.

* Mr Miller takes notice of another enemy to a crop of turnips; that is, the caterpiller, which very often attacks them when they are grown ſo large as to have ſix or eight leaves on a plant: we ſuppoſe he means in the neighbourhood of London, as this accident is ſeldom known in the country. However, he adds, that the ſureſt method of deſtroying theſe inſects is to turn a large parcel of poultry into the field, which ſhould be kept hungry, and turned in early in the morning: theſe fowls, he ſays, will ſoon devour the inſects, and clear the turnips. The nature of this remedy convinces us, he muſt mean, that caterpillers infeſt turnips near the metropolis, where they are ſown only in ſmall plots, compared to the extenſive tracts annually ſown for feeding cattle in Norfolk, and the adjacent counties. We imagine a farmer, who ſows, perhaps, fifty acres of turnips, would be puzzled to find a ſufficient quantity of poultry to clear his crop of the caterpillers, ſhould it chance to be infeſted with them: when it is the caſe, ſome other more effectual remedy muſt be found for him at leaſt.

pretty well harrowed in; in the latter it ſhould only be ſlightly ſcratched with a very light thort-tined harrow, or even only buſh harrowed; as by that means they will ſooner appear above ground, be ſooner out of danger, and thrive better afterwards, the apple of the root growing almoſt entirely out of the ground, the whole nouriſhment being collected by the tap-root, and by the horizontal roots, which iſſue from it on all ſides.

The quantity of ſeed to be ſown on an acre ſhould be from two to three pounds †, according to its goodneſs; and many uſe equal quantities of old and new ſeed, thinking this method beſt; for the new ſeed comes up firſt, and if the fly takes it, the old ſeed in a day or two ſucceeds, and generally fares better.

If a crop of turnips fails, either through any defect in the ſeed, or by the ravages of the fly or ſlug, it is uſual for the farmer to ſow the ſame land again; and this, if there is occaſion, he repeats two or three times, till at laſt he ſecures himſelf a crop. For the reaſon above mentioned, it is eſteemed beſt to ſow early, as by that means there will be time, if the firſt crop fails, to ſow another.

Turnip-ſeed is very apt to take damage from wet, if it is not covered as ſoon as ſown: without this precaution it will ſprout prematurely, malt, or mould: by too early a germination the ſeed is apt to burſt.

When peaſe are ſown on a rich mellow earth, they are apt to grow rank: in this manner they cover they ground, keep the moiſture in it, raiſe a kind of fermentation in the ſoil, and make it hollow and porous; inſomuch that when the crop has been off, turnips have been harrowed in without plowing, and have thriven amain: but there is danger in purſuing this practice without great caution. ARTI-

† Even on our correſpondent's principle of ſowing thick, perhaps two pounds of ſeed, if it is good, will be found ſufficient for an acre of land. A fourth part of that quantity would do, was it not for the many dangers to which the crop is expoſed.

ARTICLE LXXIX.

On the benefit of laying up a ſtore of Turnips againſt the winter Storms.

[Muſeum Ruſticum, Vol. I.]

I Have, in my time, ſown a great deal of land in turnips, and have applied them with great advantage to various uſes: but our chief reaſon for cultivating them in this county (Norfolk) is for feeding and fattening ſheep.

It is almoſt needleſs to ſay, that they anſwer this purpoſe extremely well: their uſe is too well known to all the eaſtern farmers to be in theſe days controverted.

We have various methods of ſpending them: ſome fold their ſheep on the land where the turnips grew; I have done this, but it is not a method I approve of: however, for the benefit of ſuch farmers as chuſe to practiſe it, I ſhall give one caution; which is, that they uſe wicker hurdles for folding their ſheep, which will otherwiſe be apt to thruſt their heads through the bars, and, tangling themſelves, are by that means often killed in the night, to the great loſs of the owner.

If, however, it ſhould not be convenient to the farmer to get theſe wicker hurdles, but he ſhould be obliged to take up with thoſe made of reft ſtuff in form of a gate, let him then be careful, when he has ſet his hurdles, and ſtaked and bound them tight, to pull up all the turnips that grow within two or three feet of the outſide of the fold, and throw them over the hurdles for the ſheep to eat within-ſide.

This will take away any temptation the ſheep may have to put their heads through the bars, and they will, by that means, eſcape the danger of being ſtrangled.

Every animal is fond of liberty; and though the ſheep will bear confinement, perhaps, better than any other creature, yet whoever has ſeen them when firſt driven into the fold, muſt have obſerved that they naturally go round the hurdles to try

try to find an opening to get out at: by this means the turnips which grow near the hurdles are trampled on, dirtied, and ſpoiled. For this there is a very eaſy remedy; let the ſhepherd only pull up all the turnips that grow near the inſide of the hurdles, and all will be well.

I obſerved before, that I am not fond of giving my ſheep turnips as they grow: I think it much the better way to have them pulled; by this means they have an opportunity of eating the whole root, and my ſtock of winter-fodder goes much farther; whereas, when they feed on the turnips as they grow, they generally ſcoop them out, and leave a hollow ſhell in the ground, which, though it may afterwards be forked up, the ſheep will ſcarcely even by hunger be induced to touch, as it cannot but be ſoaked by the dung, urine, and dirt, from the feet of the ſheep.

I find it then the beſt way, to have my turnips pulled before they are given to my ſheep; they go much farther, and do them more good.

But in this method there is one ſeeming inconvenience, which is, that in froſty weather, when the ground is hard, I cannot have them pulled; yet this difficulty is very eaſily removed, by laying up, at the beginning of the winter, a ſufficient ſtore of turnips, ſecured from wet, and not much expoſed to froſt.

I think it worth while to have a building particularly dedicated to this uſe, and find it anſwer well: it is built in form of a ſmall barn, and boarded round.

In the beginning of the winter, before the froſt ſets in, I have a large quantity of turnips pulled, and the dirt is carefully ſcraped off them; and after cutting off the heads and tap-roots, I cauſe them to be regularly laid in my ſtore with this caution, however, that all round the ſides next the boarding my men lay ſtraw, to keep out the froſt. The heads, or tops, I give to all my cattle in general, as they are cut off; by which means I, in fact, ſuffer no loſs.

I find

I find theſe ſtored turnips a happy reſource when hard weather comes on; then I open my repoſitory, and deal them out to my ſheep in ſuch a manner that there may be no waſte; and as ſoon as the weather breaks, and the earth becomes leſs hard, I reſort again to the fields, and have them pulled as uſual.

For ſome years I had another manner of ſtoring my turnips, which was by digging a deep pit in a ſandy, dry field, which being filled with turnips, they kept there very well; yet, as this method was ſubject to many inconveniencies, I left it off.

I have diſcovered another uſe for the turnip, beſides feeding my ſheep, oxen, and cows with it, which I muſt mention before I conclude this eſſay. I find it agrees remarkably well with hogs, which will eat of it greedily, and thrive on it apace.

I have ſeveral times tried this, and have often killed fine young porkers that had for many weeks eat nothing but turnips boiled in ſwill, or waſh, till they were tender.

I have at other times given turnips to large hogs, that have been put up to fatten, in order to their being killed and ſalted for family uſe, and here I was not diſappointed in my hopes; they always came on well: but I made it a cuſtom to give them, for a week or two before they were killed, a few buſhels of boiled peaſe in order to harden their fat, that it might not boil away in the pot.

I gave them boiled peas rather than raw, becauſe, having been long uſed to eating the ſoft turnip, I found they did not afterwards take kindly to the hard, raw pea.

Hogs may be eaſily brought to eat raw, unboiled turnips; but it is much better to boil them when the hogs are to be fattened; for, though they will eat enough of them raw to keep them in tolerable good plight, yet they will not eat enough to fatten them apace.

The AVERAGE of the PRICES of GRAIN in HADDINGTON, marked for each month of the present year 1773.

	WHEAT.						BEAR.						OATS.						PEASE.					
	1.		2.		3.		1.		2.		3.		1.		2.		3.		1.		2.		3.	
January	23	3	21	6 2/3	19	10	19	0 1/2	18	4	17	0 1/3	15	6	14	4 2/3	13	5 1/3	15	2	14	6	13	7 1/3
February	24	1 1/2	23	0 1/2	21	5 1/2	19	6	18	6 1/2	17	5 1/2	14	11 1/4	14	0 1/2	13	2	15	2	14	3 1/2	13	7
March	25	0	23	9 3/4	22	2 1/2	20	6	19	5	18	5 1/4	16	0	14	11 1/2	13	8 1/2	15	9 2/3	15	2 1/2	14	0 1/2
April	24	10 2/3	23	11	22	7	21	0	15	10	18	8 1/2	15	10 3/4	15	0	13	5	16	3	15	0	14	4
May	24	4 1/2	23	4 1/2	22	3 1/2	22	3 1/2	21	4 1/2	20	0	15	9	14	9	13	5 1/2	15	11	14	11	13	7 1/4
June	22	7 1/2	21	6	20	1	45	0	19	9 1/2	18	7 1/2	15	3 1/2	14	2	12	6	16	5 1/2	15	5 1/2	14	4
July	23	5	22	6	20	10	23	8	22	4	20	1 1/2	16	1	15	5	14	2 1/2	17	3 1/2	16	4 1/2	15	0 1/3
Auguſt	24	1 1/2	23	0	21	1	24	6	23	4	21	10	17	3	16	2 1/4	14	7	17	7	16	6	15	4
Septem.	23	0	22	2	20	8 1/2	23	6	21	10	20	8	16	5 1/4	15	8	14	6	17	4 1/2	16	6 1/4	15	5

THE SCOTS FARMER,

OCTOBER 1773.

ARTICLE LXXX.

Of Soils—The black loamy Soil—Clay Soil—Sandy Soil—Moſſy Soil.

[Dickſon's Agriculture, Vol. I.]

Of Soils in general.

SOILS are very different in their natures, and compounded of very different ingredients. The food of plants is compounded of very different ingredients; and manures afford theſe different ingredients in different proportions. Now it is natural to ſuppoſe, that ſoils differ ſo much in their natures from each other, that ſome contain a greater proportion of ſome of the ingredients of the vegetable food; and that others contain a greater proportion of others of theſe ingredients. It is neceſſary therefore to conſider the different kinds of ſoils ſeparately, and to enquire wherein their difference conſiſts; that ſo it may be known what kinds of manures are moſt proper for them, [p. 59.]

The ſoils moſt common in Scotland are theſe following: The black loamy ſoil, the clay, the ſandy, and the moſſy. Of all theſe there are great varieties, ariſing from the different proportions of that kind of earth from which they take their names; as alſo from a mixture of theſe kinds of earth with each other. It is difficult to determine to what claſs ſome ſoils belong, as it is difficult to know what kind of earth prevails moſt in them.

Of the black loamy Soil.

Loam, it is probable, is not an original ſoil, but the earth of rotten vegetables.

If land has continued long uncultivated, and has carried vegetables, which from time to time have rotted upon it, the original ſoil is buried, and a new ſoil made up of the earth of rotten vegetables formed. This new ſoil, formed by the rotting of vegetables, is what is commonly called Loam. And it is probable, that all loamy ſoils have been formed in this way, or by the repeated application of dung, the earth of which, as was before obſerved, is of the ſame kind with the earth of rotten vegetables.

The qualities of loam are as follows:

When allowed to reſt, its parts acquire a degree of coheſion. In this it differs from ſand, and has a reſemblance to clay, but never becomes ſo tough and hard.

When turned up and expoſed to the air, it breaks eaſily in pieces, and becomes free and open. In this it differs from clay, and has a reſemblance to ſand, but does not ſeparate into ſuch ſmall particles *.

When dry it receives water eaſily. In this alſo it differs from clay, and has a reſemblance to ſand.

When it receives the water, it ſwells with it, and retains it like ſhell-marle. In this it differs from ſand, and has a reſemblance to clay, but ſwells more, and does not retain ſuch a quantity †.

When a large quantity of water falls upon this ſoil, it retains a proper ſhare of it, and allows the reſt eaſily to run off.

* Loam may be ſeparated into more minute particles than ſand, but the air muſt act upon it for a conſiderable time before this is done.

† It is obſerved, that in this, and in all ſpungy ſoils, the crowns, of the ridges, though high raiſed, are never quite dry, while water ſtagnates in the furrows.

off. In this again it differs from clay, and has a reſemblance to ſand. There are other ſoils that have the ſame quality with this; they receive water eaſily, ſwell with and retain it: but this ſoil has greatly the advantage in this reſpect, that it retains only a proper quantity, and allows the ſuperfluity eaſily to run off, when there is a proper deſcent; whereas the other ſpungy ſoils retain, though there is a deſcent, a larger quantity than is neceſſary for nouriſhing the plants which we cultivate in our fields.

Loam then, in ſome reſpects, is a medium between clay and ſand.

It acquires a degree of firmneſs greater than ſand; it is not ſo eaſily broken in pieces; it does not ſo eaſily admit water, and it does not ſo eaſily part with it.

It does not acquire ſuch a degree of firmneſs as clay; it is more eaſily broken in pieces; it more eaſily admits water; and it more eaſily parts with it.

But in ſome reſpects it differs from both. It has a ſtrong abſorbent quality; it contains oil, and it attracts and ferments with acids.

The ſoil which has loam in its compoſition, poſſeſſes in ſome degree the qualities of loam: and if theſe qualities are conſidered, it will appear, that this kind of ſoil is the moſt proper for nouriſhing plants.

It has plenty of food; the power of attracting this food from the air; a large paſture, and the power of diſſolving the vegetable food, and fitting it for entering the roots of plants.

The oils which it contains, and ſalts which it produces, afford vegetable food; the ſalts which it produces, and the ſtrong abſorbent quality which it poſſeſſes, attract this food from the air: its free and open nature, its ſwelling with water, and its fermenting with acids, afford a large paſture; and the ſalt which it produces by fermenting with acids diſſolves its oils, and fits it for entering the roots of plants. This is

confirmed

confirmed by experience. The ſoil compounded of loam, is found to be the moſt fruitful of all others. Some other ſoils, when manured with lime or dung, bear as great, perhaps greater crops for ſome years than this does, but then they ſooner need a ſupply. The difference between them ſeems to conſiſt in theſe things. Soil manured with lime has a greater proportion of ſalts than of oils in its compoſition, and has alſo a greater power of forming ſalts than of attracting oils; and therefore, by the great crops it bears, its oils will be wholly exhauſted, and it will become almoſt quite barren: whereas the loamy ſoil, having an equal proportion of oils and of ſalts in its compoſition, and as great a power of attracting oils as of forming ſalts, will not be exhauſted by the crops which it bears; but will always retain a quantity of its oils undiſſolved, and be receiving a conſtant ſupply from the air. The ſoil manured with dung has greater plenty of vegetable food in its compoſition, than it has the power of attracting this food from the air; and therefore by every crop that carries off more vegetable food than is attracted during the ſeaſon, the ſoil muſt be rendered leſs fertile; whereas the loamy ſoil has the power of attracting the vegetable food from the air, almoſt in proportion to the quantity it contains, and therefore continues to be fertile notwithſtanding the crops which it bears. It is obſerved, that ſome kinds of this ſoil, which have a great proportion of loam, and are, in a great meaſure, free from clay and ſand, continue to carry good crops, without being in the leaſt exhauſted. This is owing to their great abſorbent quality, to their attracting, during the winter, from the air, ſuch a quantity of vegetable food as is ſufficient for nouriſhing the crop during the ſummer.

It has been obſerved, that loam receives water eaſily, and retains it, and that it alſo eaſily parts with water when in too great a quantity. The loamy ſoil therefore cannot ſuffer much either from drought or rain, unleſs they are violent. This is confirmed by experience; for it is found, that the

loamy

loamy ſoil does not ſuffer ſo much from drought as the ſandy, and does not ſuffer ſo much either from drought or rain as the clay.

All ſoils, in proportion to the quantities of dung that have from time to time been laid upon them, approach the nearer to this kind; for the earth, into which animals, vegetables, and dung are turned, after they are wholly putrefied, is of the abſorbent kind, and of the ſame nature with this ſoil. And though there is but a ſmall quantity of earth in the largeſt quantity of dung laid on at one time; yet, if the laying on of the ſame quantity is repeated once in four or five years for ſome ages, as certainly has been done upon ſome lands, a conſiderable proportion of the ſoil muſt now be of this abſorbent earth, whatever it was originally. All land called *infield land*, has a mixture of this kind of ſoil in its compoſition; and the difference betwixt infield and outfield, is owing to the quantities of dung laid from time to time on the infield.

The ſoil in which there is a great proportion of loam, needs very little manure. It may be kept conſtantly in good heart by proper tillage, and a good ſcheme of management. There is however but a ſmall quantity of this kind. The generality of that which goes under the name of loamy ſoil requires manure, and no kind of manure is improper for it. Dung, ſoot, ſea-weed, vegetables, and the other manures of this kind, add to its vegetable food; and lime, aſhes, and marles, find vegetable food to work upon. But as this kind of ſoil has the vegetable food, and the power of diſſolving it in juſt proportions, dung, and the other manures which continue there in their juſt proportions, are certainly the moſt proper. When lime is applied, if care is not taken, it will ſoon rob this ſoil of its oils: for as this ſoil has in itſelf a power of attracting and fermenting with acids, lime, which adds to this power, will ſooner rob it of its oils, than other ſoils that have not this power.

Of

Of the Clay Soil.

There are different kinds of clay ſoils. The richeſt kind conſiſts of clay and loam. Probably it has been originally clay, and by the application of dung, or the rotting of vegetables that have from time to time grown upon it, has received the mixture of loam.

To know the nature of this ſoil, it is neceſſary to conſider the qualities of clay, which are as follow.

Clay is a very ſolid body, its parts adhere very firmly together. It does not eaſily admit water; it is capable of receiving a large quantity: when it receives water, it ſwells but little, and does not eaſily part with it.

In theſe reſpects it differs from loam and ſand. For their parts do not adhere together with firmneſs; they eaſily admit water, and they eaſily part with it; ſand eaſily parts with a very ſmall quantity.

Clay, when dry, is very hard; and the more ſuddenly it is dried, it becomes the harder. It contracts in drying, but not equally in all its parts; where the coheſion is weakeſt, it opens in rents.

Chymiſts ſay, that clay does not ferment with acids, but that it has oil in its compoſition. This however does not appear quite certain.

Soil in which there is a mixture of clay, muſt partake in ſome degree of its qualities. When theſe are conſidered it will appear, that this ſoil is not ſo proper for nouriſhing plants as the loamy ſoil. It is much expoſed to injuries from the weather, and muſt ſuffer greatly from exceſſive drought or rain.

As it is capable of receiving a great quantity of water, and does not eaſily part with it, if the ſeaſon is rainy, the roots of plants will be continually ſoaked in water, and thereby the plants themſelves weakened or deſtroyed.

As it turns hard when dry in a great drought, the pores of the ſoil will be ſhut, the paſture leſſened, and the plants unable

able to ſearch for their food. As, in contracting by drought, it opens in rents, thereby ſome of the roots will be torn aſunder, and expoſed ſo much to the air, as to endanger the deſtruction of the plants.

Experience confirms the truth of theſe things. For it is obſerved, that clay ſoils are actually more uncertain than loamy ſoils, and the crops upon them more precarious, and more eaſily damaged by drought or rain.

As clay does not eaſily receive water; dews and ſoft ſhowers of rain, which are ſucked in by the loamy ſoil and retained, make no impreſſion on the clay ſoil; but being reſiſted by the ſurface, are ſoon exhaled by the ſun. It is obſerved ſometimes, that when the plants, both upon the clay and loamy ſoils, are beginning to ſuffer from the violence of the drought, ſoft ſhowers being eaſily admitted by the loamy ſoils, recover the plants upon them, while the plants upon the clay ſoils, which reſiſt theſe ſhowers, receive no benefit.

It muſt be allowed, however, that it is not in every circumſtance, that the crop upon the clay ſoil is more damaged by drought, than the crop upon the loamy ſoil. If the drought ſets in immediately after the land has got the ſeed-furrow, the clay ſoil is apt to dry ſo ſuddenly, and turn ſo hard, that a great part of the ſeed ſown is prevented from ſpringing up, and the plants that are growing do not find ſufficient food. On the other hand, if the drought does not ſet in immediately after the plowing, but the ſoil allowed to continue ſoft, and ſufficient ſap allowed to remain for making the whole ſeed vegetate or ſpring up; then though the drought ſhould afterwards be very violent, yet the ſoil, being covered with the young plants, will not dry ſo ſuddenly, nor turn ſo hard as to prevent them from finding their food. The ſoil having dried ſlowly, and in drying been frequently moiſtened with ſhowers, will only cruſt a little above, and thereby prevent the drought from penetrating. In this caſe, when the drought does not ſet in early, plants will flouriſh on the clay ſoils, even when they

they are ſuffering upon the loamy ſoils, by reaſon of the violence of the drought.

If muſt be obſerved likewiſe, that clay land, when dry ſituated, does not ſuffer ſo much from drought as when wet. When clay land is wet ſituated, having a greater degree of wetneſs when the dry ſeaſon begins than the dry-ſituated land, it will on that account dry more ſuddenly. Beſides, even in the dry ſeaſon, it is generally too wet; and in this condition being plowed, it muſt dry much faſter in the ſame time than dry-ſituated land, either before or after plowing, and thereby becomes much harder. This has been mentioned to ſhow, that all clay lands do not ſuffer equally from drought; that ſuch as are dry-ſituated ſuffer little more from it than loamy ſoils; and that they do not ſuffer ſo much either from rain or drought, as thoſe that are wet-ſituated.

It will not be improper to obſerve from this, that it is of the utmoſt importance to manage clay land in ſuch a manner, as to keep it as dry as poſſible during the winter. For thereby it is not only in a condition for being plowed more eaſily in the ſpring, but the crop upon it is alſo in leſs danger of ſuffering either from rain or drought.

It has been obſerved, that clay contains oil, but does not ferment with acids. It would ſeem, then, that the clay ſoil has the vegetable food in greater plenty than it has the power of diſſolving it; and therefore that lime, aſhes, or marle, are the moſt proper manures for it. Theſe manures will ſeparate and diſſolve its oils, and render them fit for entering the roots of plants. They will likewiſe communicate to it their abſorbent qualities, will open its pores and enlarge its paſture, Theſe things will make it more eaſily to admit the water, and more eaſily to part with it; by which it will become leſs expoſed to injuries from the weather, from violent rains or drought.

It was the general opinion ſome time ago, that lime anſwered better on light land than on clay. This is inconſiſtent with

with what has been advanced. The foundation for this general obſervation probably is this; Clay ſoils are generally much wetter than light ſoils; and as the virtues of lime are extracted by water, thereby its powers muſt be greatly leſſened upon the generality of clay ſoils. That it is owing to this that lime does not anſwer upon ſome clay ſoils, is moſt probable: for, upon trial, its effects are found to be very great upon clays that are but tolerably dry ſituated.

It was alſo the general opinion ſome time ago, that marle was only proper for light land; but the contrary is now, upon trial, found to be true. Its effects on clay land continue much longer than on light land.

It is no objection to what is here propoſed as the beſt manures for clay ſoils, that dung anſwers very well on them: for dung, as it contains every thing proper for promoting vegetation, muſt anſwer on all ſoils.

Clay ſoils, though they partake of the nature of clay, yet, from the other ingredients in their compoſition, are very different from each other. When mixed with loam, as has already been obſerved, they are rich; but when mixed with ſand or till, are very poor. Lime, marle, or aſhes, as has been obſerved, are very proper manures for rich clays. But the poor clays require ſuch manures as contain the greateſt plenty of the vegetable food, ſuch as dung, ſhell-marle, ſea-weed, &c. But theſe, ſhell-marle excepted, do not operate ſtrongly in enlarging the vegetable paſture, nor in communicating to the earth a ſtrong abſorbent quality, which we have already obſerved, are neceſſary qualities in the manures moſt proper for all clay ſoils. Shell-marle is poſſeſſed of theſe qualities, and is therefore a proper manure for poor as well as rich clays. But if it cannot be obtained, a mixture of lime and dung, or of dung and marle, will ſerve in its place.

It is an ordinary practice in ſome places, to lay both dung and lime upon fallow land, even when the ſoil is naturally good; and the applying theſe together is found to anſwer bet-

ter, than applying one of them only, though in a greater quantity. There is good reaſon to ſuppoſe, that the applying theſe together upon poor clays will be attended ſtill with greater advantages.

We have obſerved, that, when clay is mixed with ſand, it is generally very poor; and yet ſome writers propoſe ſand as the moſt proper manure for clay. They aſſure us, that nothing more is neceſſary to give it all the qualities of rich loam, than to apply ſand in a ſufficient quantity. This, I am perſuaded, is aſſerting too much, and what they have not ſufficient experiments to juſtify, notwithſtanding their aſſertions.

Of the ſandy Soil.

There are ſeveral kinds of ſandy ſoils. The beſt kind is a mixture of ſand and loam. Sand itſelf is of two different kinds. The one conſiſts of ſmall particles of flint, the other conſiſts of ſmall broken ſhells. Often theſe two are mixed together, which may be called a third ſort.

The qualities of ſand of flint are as follow:

It eaſily receives water, and it eaſily parts with it. Rain makes it firmer, and leſs in bulk. The particles of it do not adhere together; and it is ſuſceptible of greater heat from the ſun, than any thing of which other ſoils are compounded.

It appears, then, that the qualities of this kind of ſand are directly oppoſite to thoſe of clay.

The ſand of ſhells has nearly the ſame qualities with theſe mentioned; but differs from the other in theſe things following:

The ſand of ſhells, like ſhell-marle, attracts and ferments with acids, is capable of being diſſolved, and contains oil; whereas the ſand of flint does not attract acids; the particles of it, like the firſt atoms, are incapable of diſſolution, and, if it contains any oils, it is impoſſible to ſeparate them.

Soil which has a large proportion of ſand in its compoſition, muſt, in ſome meaſure, partake of the nature of ſand. And, if

if this is conſidered, it will appear that the ſandy ſoil is ſtill more unfit for nouriſhing plants than the clay ſoil.

As it eaſily parts with water, there will not be a ſufficient quantity in a dry ſeaſon to promote vegetation.

As the particles of it do not adhere together, it will not be able to ſupport vegetables that have but few roots, and grow tall.

It may be obſerved, particularly with reſpect to the ſoil compounded of ſand of flint, that as it contains no oils, it muſt have but little vegetable food; and, as it has no abſorbent quality, it will receive but a ſmall ſupply from the air. And it may be obſerved, particularly with reſpect to the ſoil compounded of ſand of ſhells, that, as the ſhells contain oil, and as they diſſolve gradually, though ſlowly, it has naturally a larger quantity of vegetable food than the other; and, as it attracts and ferments with acids, it receives alſo a greater ſupply from the air.

The defects of the ſandy ſoil point out the manures moſt proper for it.

The manures moſt proper for the ſoil compounded of ſand of flint, are ſuch as make it retain water, render it firmer, and ſupply it with vegetable food. Clay will help to make it retain water, and make it firmer; but clay contains but little vegetable food. Dung will ſupply it with vegetable food, but will not render it firmer, nor make it retain water. Moſs will help it to retain water, and ſupply it with vegetable food, but will not make it firmer †. A mixture of clay and dung, or of clay and moſs, ſeems to be the moſt proper manure, and beſt fitted for ſupplying its wants.

A mix-

† Dr Home is of opinion, that moſs alone is the moſt proper manure for ſand. He ſays, that moſs is as impervious to water as clay, and contains more oil than any other vegetable. He adds, that it has been tried, and is found to anſwer very well. But it may be obſerved, that moſs cannot render ſand any firmer, and therefore will not enable it to ſupport a great crop of corn.

A mixture of either of theſe will alſo be a proper manure for ſoil compounded of ſand of ſhells. But if any thing could be found that would quickly reduce ſhells to a ſtate of corruption, which ſeems to be the condition of ſhell-marle, that thing would certainly be the moſt proper manure for this kind of ſoil.

The authors of the Complete body of huſbandry mention a field of ſand manured with clay, which had retained its fertility for thirty years, and, in their opinion, would hold good ten or twelve years more. That laying clay upon a ſandy ſoil, and ſand upon a clay ſoil, will do ſervice, is very probable; but that it will anſwer the expence, is uncertain. The farmer muſt therefore be on his guard, leſt he be led into a fruitleſs expence by authors, whoſe aſſertions are more frequently founded upon common report than their own experience.

Of the Moſſy Soil.

Moſs is commonly ranked in the claſs of vegetables. It is not very certain whether the vegetables are alive or dead. That kind of moſs of which peat is made, is probably vegetables in a living ſtate; but that kind that is free and open, is certainly the roots, and other parts of dead vegetables in an uncorrupted ſtate. The kind of moſs moſt common has very little firmneſs, either when wet or dry, and, it is obvious, is not alive.

The qualities of moſs are as follow:

It has oil and ſalt in its compoſition, as all vegetables have. It does not eaſily putrefy, and it prevents other bodies from putrefaction. It eaſily receives water, ſwells with it like a ſponge, retains a large quantity, and does not eaſily part with it.

As moſs, whether dead or alive, is in an uncorrupted ſtate, to render the moſſy ſoil fit for nouriſhing vegetables, the moſs in it muſt be reduced to putrefaction. This will not only ſupply it with plenty of vegetable food, but will alſo render it much firmer, and make it more eaſily to part with water.

The

The manures that ferment moſt violently with acids, ſeem to be the moſt proper for this end.

Theſe manures, aſſiſted by frequent plowings, will certainly make ſome parts of the moſs putrefy.

Of all theſe the clay and ſtone marles ſeem to be the moſt proper; becauſe theſe will not only raiſe a violent fermentation, but will alſo fill up its pores, and make it more ſolid, by which it is rendered more proper for reſiſting the entrance of water.

It is neceſſary to obſerve, that if the moſs is deep, or has not a ſolid bottom, lime is not proper; becauſe, by its weight, it will ſoon penetrate beyond the reach of the plough. The marle will alſo do this, but not ſo ſuddenly as lime; but if the moſs has a ſolid bottom to reſiſt the lime, this manure will anſwer very well. Beſides its other qualities, it has a power of diſſolving animal and vegetable ſubſtances. This is confirmed by experience. Lime is found to improve this kind of land ſo much, that in ſome places where the land is not originally worth half-a-crown of yearly rent per acre, it is laid on at the expence of ſix pounds Sterling per acre; ſo that the laying on the lime to anſwer the expence, muſt raiſe it to four times its original value.

When any manures are applied to moſs, the fermentation will be violent, and it will continue while the moſs is putrefying. During this time it cannot be proper for nouriſhing vegetables. The violence of the fermentation will throw the ſeeds, and ſometimes the roots, out of the ground *; and even when putrefied, being very looſe and open, will greatly encourage the growth of creeping weeds. It ſeems proper therefore to allow it a conſiderable time to ferment after the

* There are ſome kinds of ſoil that frequently do this, particularly after froſt, which muſt be owing to their fermentation. When a ſoil does this frequently, it is almoſt a certain mark that there is moſs in its compoſition.

the manure is laid on, before any ſeed is ſown; and to deſtroy theſe weeds, ſo apt to grow upon it, frequent harrowings as well as plowings ſeem neceſſary.

It is commonly obſerved, that the frequent plowing of this ſoil makes it run much to chicken wort, and other creeping weeds, by which the crop is often deſtroyed. And hence it is become almoſt a general practice to plow it but ſeldom, which is found to anſwer better. But if this ſoil was fallowed for two ſeaſons, and frequently plowed and harrowed each ſeaſon, it is natural to think that the putrefaction of the ſoil would be promoted, weeds deſtroyed, and the ſoil in a much properer ſituation for nouriſhing vegetables than when it receives only a few plowings.

ARTICLE LXXXI.

Of the propriety of ſtoning Land.

[In a letter to the Editors.]

THIS letter comes to you from a farmer, who became one, not from neceſſity, but from choice; and as I conceived highly of the profeſſion, every thing that promiſes to contribute towards its improvement, gives me pleaſure. For this reaſon I greatly approved of your propoſed plan for ſpreading uſeful and experimental knowledge among our farmers, periodically, and at a ſmall expence; and if the execution of it has pleaſed your other readers as well as it has me, it muſt have met with very general approbation. Such of your eſſays as are intended to explain the principles of vegetation, and the rational foundation of agriculture, may be of great ſervice in leading the common farmer into a train of thinking and judging of theſe ſubjects, ſo as to diſcern how far the inſtructions given may be properly applied to his own caſe, or if the experiments and practice of others have a probable

bable chance of equal ſucceſs upon his own grounds. But it is not from theſe eſſays, that the greateſt good is to be expected: the inſtructions from practical farmers, drawn from their own experience, and the detail of their own practices, will have greater influence upon the minds of moſt common farmers, than the moſt convincing arguments drawn from the nature of earth, air, oils, and ſalts, and their mutual operations upon one another; which require ſome knowledge in philoſophy to comprehend, and a mind habituated to a train of reaſoning to follow. I therefore heartily wiſh, that your correſpondents were more liberal in the accounts of their own methods of farming, though theſe may be common and familiar in the country where they live; and particularly of any practices that may be different from the common; and what is their ſucceſs. Such things will be conſidered by their brother farmers, as inſtances of weight and authority which they may rely upon, and may ſafely venture to try; and though they may find, that ſuch things may require ſome more labour and attention than is commonly beſtowed upon their common courſe of labouring, yet they will, by the great hopes of ſucceſs, be encouraged to perſevere; and by degrees to overcome their prejudices in favours of ancient practices; and, in place of the indolent and ſlovenly manner of farming they have been bred up in, they will inſenſibly become fond of that which is more active, vigorous, and neat, and redounding more to their ſatisfaction as well as to their profit.

I am induced to write you this letter, in order to make ſome obſervations upon a paper I ſee publiſhed in the Edinburgh Weekly Magazine, 13. May 1773, entitled, *Stones not hurtful to Land*, and ſubſcribed, *An Hertfordſhire Farmer*. In which it is ſaid, "That it has been long known to ex-"perienced farmers, that taking away ſmall ſtones and flints "is detrimental to plowed land in general; but more par-"ticularly ſo, to all thin ſtapled light lands, and to all lands "of a binding nature: But that it was never imagined, that

"the

" the damage could be ſo great, as it is now found to be,
" ſince unuſual quantities of flints and other ſtones have been
" repeatedly gathered for the uſe of the turnpike roads." And after inſtancing a particular field, which, by having its flints and ſtones repeatedly picked off, is now rendered inferior to lands that were formerly reckoned not much above half its value; he ſays, " That ſeveral thouſand acres ordering
" on the turnpike roads from Wellwyn to Baldock, have been
" ſo much impoveriſhed, that the loſs to the inheritance for
" ever muſt be computed at a great many thouſand pounds:
" And to put it beyond a doubt, that the prodigious impo-
" veriſhment of the land is owing to no other cauſe, but
" picking and carrying away the ſtones, he ſays, that theſe
" lands have generally been moſt impoveriſhed, which have
" been moſt frequently picked: and in one field, part of which
" was picked, and the other part plowed up before they had
" time to pick it, the part that was picked loſt ſeven or eight
" parts in ten of two ſucceeding crops: and though the whole
" field was manured and managed in all reſpects alike, yet the
" impoveriſhment was viſible where the ſtones had been pick-
" ed off, and extended not an inch farther: an inconteſtible
" proof of the benefit of the ſtones."

From reading this letter, with the title prefixed to it, a perſon, not habituated to queſtion authorities, would be apt to draw a general conluſion, that in every caſe it muſt be prejudicial to remove the ſtones off lands; and this concluſion will be the more readily embraced, that it flatters the too general inclination which mankind have to indulge themſelves in ſloth and inactivity; for which they are always ready to graſp at the firſt excuſe that offers. This is remarkable as to the preſent queſtion: There is not a corner in Scotland, where ſtony land is found, and a farmer is adviſed to relieve his land of that incumbrance, but he has ready at hand a ſtory of farmer ſuch-a-one, who threw the ſtones off his ground, and his crops after it were ſo very bad, that he was glad to be at the trouble

trouble to throw them on again: and thus he at once ſaves himſelf from the imputation both of idleneſs and of obſtinacy.

That there may be lands which are the better for the ſtones upon them, and which may be hurt by removing them, I am obliged to acknowledge from what has been ſaid and wrote on that ſubject; but I will venture to ſay, I never yet met with them: Mr Mills, in his huſbandry, Vol. I. p. 74. ſays, 'That it has been argued, and is not yet determined, 'whether ſtones are hurtful or beneficial to arable lands: ex-'amples are not wanting on both ſides of the queſtion; 'though in general it ſeems rather to be carried for them. 'However nothing can excuſe leaving a ſtone in any ground, 'ſo large as to interrupt the plough. If they are very large, 'they ſhould be blown to pieces with gun-powder, and then 'be carried off. Some ſpots very fertile in ſeveral kinds of 'grain, ſeem to conſiſt of nothing but ſtones; and inſtances 'are given of fields being rendered barren by taking away 'the ſtones which covered them. Theophraſtus accounts for 'this in a hot country, where it happened to the Corinthians, 'by ſaying, that the ſtones ſhelter the earth from the ſcorch-'heat of the ſun, and thereby preſerve its moiſture. The 'ſame holds true even in our colder latitude, when the heat 'of the ſun is leſs apt to hurt us; and Mr Evelyn is clearly 'of opinion, that huſbandmen rather impoveriſh than im-'prove thoſe grounds which are almoſt covered with ſtones, 'eſpecially where corn is ſown, if they pick them off too mi-'nutely; becauſe they thereby expoſe the land too much to 'the effects of heat and cold. Certain it is, that a moderate 'mixture of ſmall gravel preſerves the earth both warm and 'looſe, and prevents too ſudden exhalations. But it ſeems 'highly probable that there muſt be ſome farther reaſon be-'yond what has yet been aſſigned, for the benefit ariſing from 'ſtones; and that the ſtones which are thus beneficial are of 'the limeſtone or calcarious kind. And to ſupport this, he 'ſubjoins an inſtance, told by Mr Du Hamel, "That the

" duſt from the cuttings of ſome ſtones of the marble kind uſed " for building, cauſed the graſs all about to grow ſurpriſingly " thick, and much taller and greener than any where elſe, " and that it preſerved its vigour for ſeveral years. One would " ſcarcely have thought, that ſo hard a ſtone reduced to pow- " der, would have produced an effect like that of marle: the " goodneſs of lime as a manure is, perhaps, chiefly owing to " the fineneſs of the powder, to which the limeſtones are re- " duced by calcination. This fact may help to clear up ano- " ther, which cannot have eſcaped the notice of thoſe who at- ' tend to the differences of ſoils. They muſt have obſerved " ſome grounds ſo thickly covered with ſtones, that ſcarce any " thing elſe is ſeen after a heavy ſhower of rain: Yet ſome " of theſe lands are very fertile, and produce fine wheat. I " know not whether I am miſtaken; but I think I have ob- " ſerved that this fertility is found only in fields where thoſe " ſtones are calcarious of the limeſtone kind. It is very proba- " ble, that the duſt which is formed by the mutual rubbing of " theſe ſtones contributes to that fertility."

' The farmer may eaſily inform himſelf whether this be the ' caſe: and if it is, he has a certain rule to go by in the ma- ' nagement of ſtones, to wit, by trying with Aqua-fortis, ' or ſpirit of ſea-ſalt, whether they are calcareous or not: for ' every ſtone on which the ſpirit does not effervеſce, is of no ' uſe, and therefore ſhould be removed, as an impediment to ' the neceſſary labour. However the prudent huſbandman ' will make the experiment of clearing his land, firſt on a ' ſmall ſpot, that he may be ſure of the ſucceſs, before he em- ' barks in a greater expence.'

If from this experiment, or other certain ſigns, the farmer has good reaſon to believe, that his ground is benefited by the ſtones from their proper quality, he would certainly be in the wrong to remove them: But as I ſaid before, in all my obſervation, I have never yet ſeen any ſtony ground, that received that benefit from its ſtones. Certain it is, that where they are

of

of the free-ſtone kind, they are hurtful. The blue whin is ſo obdurate, that it can afford nothing of a fructifying quality, as it neither yields to the weather nor to friction; and the grey rock, ſuch as is generally found upon the dry-field grounds upon the declivity of hills and mountains, is no leſs ſo. There is a crumbly rock, which I have obſerved, but know nothing of its quality; and therefore ſhall neither praiſe nor diſpraiſe it. The Engliſh writers on agriculture frequently mention a kind of ſoil called limeſtone-gravel; the ſtones of which, according to the idea which the name imports, may be of the calcarious kind before mentioned: But of that we know nothing in Scotland. I have heard indeed that ſome of the Weſtern iſlands, particularly Liſmore, ſtands entirely upon limeſtone; and there the duſt ariſing from the ſmaller pieces of rock mixed with the ſoil, may communicate to it a very fructifying quality; which is more than probable, as the grounds there are ſaid to be very rich, and to yield great crops.

If the farmer has no reaſon to ſuſpect, that his grounds are benefited by the quality of the ſtones upon them, he ought next to conſider, whether the other reaſon urged for allowing them to remain has any weight, to wit, that they protect the land from the effects of heat and cold. For my own part, I rather think they have the contrary effect: for in a hot ſunſhine day, let him compare the heat of the ſtones upon the ſurface, with that of the ground, and he will find it incomparably greater; and in like manner in a cold froſty day, the ſtones are greatly colder than the ground, in ſo much that if a plant of corn has its root below the ſtone, it cannot fail to be greatly affected by it, and as it were ſodden by the heat, or pinched to death with the cold. Several other inconveniencies attend plants growing in ſtony grounds: If a ſeed of corn happens to lye below a ſtone, the young plant when it ſprouts may have ſeveral inches to travel before it reach the open air, when the other grains have immediate acceſs to break through the clod;

clod: and if any of the crops recommended as improvements in the modern agriculture, which require a free ſoil void of interruptions for the ſwelling of the roots, or for hoeing in the rows, as turnips, carrots, parſnips, and cabbages, ſhall be tried, it is plain, that the ſtones muſt firſt be removed: and if grounds are to be laid down in graſs for hay, the farmer need not be told that the ſurface muſt be relieved of the ſtones, before he lays down his ſcythe.

From theſe reaſons, I have been induced to perſevere in removing every ſtone from my grounds that I poſſibly can; and hitherto have had no reaſon to repent it. If my brethren ſhall be thereby convinced to ſpend ſome of their idle hours to the ſame purpoſe, they will in time find it will turn to their account; as few of them, of the lower claſs at leaſt, but lounge away a great part of their time to no purpoſe at all. A habit of idleneſs is acquired by indulging it; and till our farmers ſhall learn to put a value upon their time, ſo as to call every hour to account, I will venture to propheſy they will never thrive. Here then is one fund of employment, which few farmers in Scotland need be without, the Carſe farmers excepted. And if by this letter I ſhall be the means of ſpurring them on to employ ſome hours or days which otherways would be void of buſineſs, I gain a deſireable end.

I ſhall not however be too poſitive, that the judges whom you conſult will think this letter worthy a place in your collection, as the ſubject may appear too trifling, to take up ſo much room. My own zeal in the matter has, however, prompted me to write, though naturally averſe to that buſineſs, in hopes it may be of ſome ſervice to my brethren, whoſe ſucceſs is the earneſt wiſh of, Sir,

Your moſt humble ſervant,

F——

ARTI-

ARTICLE LXXXII.

Practical Obſervations of an ESSEX FARMER, *for curing* WHEAT *damaged in the Field by Rain in Harveſt.*

[RUDDIMAN'S WEEKLY MAGAZINE, Sep. 23. 1773.]

A Wet harveſt is what a farmer dreads more than almoſt any thing, as it hurts the quality of his corn, increaſes expences, and greatly leſſens his profits.

So much depends upon the well-getting in of our bread-corn, that every man who knows any thing that can forward ſo good a purpoſe, is in duty bound to communicate it for the benefit of the public.

It is a well known maxim, that wheat ſhould be left ſome days in the field after it is cut, before it is inned. This the farmers think (and not without reaſon) improves its qualities: the dew plumps the kernels, and the ſun brings it to a proper and perfect ſtate of maturity.

Theſe, then, are the benefits that reſult for leaving the ſheaves for ſome time abroad; but it is neceſſary the weather ſhould be fine, or great loſſes are often the conſequences of this practice.

Sometimes, when the farmer leaſt expects it, the weather ſets in foul, and it rains for ſeveral weeks ſucceſſively: it is then very difficult to preſerve the wheat from being greatly damaged, notwithſtanding the many contrivances that have been thought of for this purpoſe.

Some ſhock their ſheaves, ſetting them up in traves of ſix ſheaves of a ſide, and two to cape them; but this is a very dangerous method, and never to be practiſed after much rain has fallen. If the ſheaves were dry when they were ſet up, from an expectation of its raining, it is of great ſervice; but if they are firſt ſuffered to be wet, ten to one but the corn ſweats,

ſweats, ſprouts, and rots, by being ſo cloſs confined from the action of the air.

In Middleſex, Kent, and ſome parts of Eſſex, they generally bind their wheat as they reap; but then it muſt be ſuppoſed that their crops are for the moſt part pretty clear from green weeds, which would otherwiſe cauſe the ſheaves to ſweat violently in the mow, and greatly damage the corn.

If a farmer is ſo unfortunate as to have his wheat ſheaves thoroughly wetted, if fine weather enſues, I would by all means adviſe him to unbind them, and afterwards ſpread them out to be dried by the ſun. This ſimple method will often prevent great loſſes, and the wheat may at laſt be got *in* in tolerable good order.

If the rain, however, ſhould continue long, and there ſhould be danger of the kernels growing (which by obſervation he may eaſily judge of), I would adviſe the thinking farmer to carry it inſtantly home, wet, as it is, and afterwards manage it as I ſhall direct, from my own frequent experience.

When the waggon or cart comes home loaded with ſheaves, let them be thrown promiſcuouſly into the bay of the barn, and not regularly mowed; for it is neceſſary they ſhould lie hollow, that the air may get into the vacuities, and prevent ſheaves from heating during the little time they are to continue in the ſituation above deſcribed.

Let the farmer next prepare ſome cutting boxes, ſuch as horſe meat is cut *in* in Kent and ſome other countries.—The number of theſe boxes ſhould be according to the quantity of wheat he has wet; but three or four conſtantly kept going, will do a great deal of work.

With theſe cutters let the ears be cut off from the wet ſheaves; and when a ſufficient quantity are collected from all the boxes, let them be put looſely up in ſacks, and carried to a malt-kiln, there to be regularly and gradually dried; and when the firſt parcel is done, another is to ſucceed, and ſo on till the whole work is completed.

This

This method I can from my own experience recommend; and it is leſs expence than would at firſt thought be imagined. The heat of the kiln may be kept up higher than when malt is drying, as the chaff of the ear will prevent the kernel of the wheat from being damaged by the fire, unleſs the heat is very intenſe; but it will however be proper to keep the ears gently ſtirring with a fork or rake during the time they are drying.

In this manner the farmer will find great advantage, and his wheat will, with a very inconſiderable additional expence, be nearly, and ſometimes quite as good in a wet harveſt as if it had been houſed in ever ſo good order, in fine ſun-ſhining weather.

If, by chance, after you have cut off the ears of the ſheaves, the weather ſhould change and become fine, you may often dry them without the aſſiſtance of the kiln, by ſpreading them thin on a large threſhing cloth, and turning them frequently with a wooden rake; and even if this method ſhould not dry them entirely, it will ſtill bring them ſo far forward, that the kiln will eaſily complete the cure. I muſt, however, caution the farmer not to ſuffer the kiln to be too much heated, unleſs the ears are kept conſtantly ſtirring during the time they are drying.

ARTICLE LXXXIII.

Receipt to prevent the bad Effects of Turnips on Butter, and to make it as ſweet as any Graſs Butter.

[From the YORK CHRONICLE.]

MILK your cows in your farm yard; as you milk it, carry it warm from the cow to your dairy, and, firſt putting a quart of boiling water into your lead or panſion, ſyle your milk as warm as poſſible into the ſame. When you take off your cream, put a common tea-cup-full of ſalt, with every two quarts of cream, into the cream pot.

ARTI-

ARTICLE LXXXIV.

Anſwers to ſeveral of the Queries inſerted in N° I.—*Calculations of the Expence and Profit of different courſes of Crops, on a two hundred acre farm of Loam.*

[In a letter to the PUBLISHER.]

BY your inſertion of my laſt, [p. 507.] I conſider myſelf as laid under the obligation of ſending you anſwers to two or three of your queſtions.

In your queries on moſs, [p. 27.] you aſk, What trees will thrive beſt upon them?——I anſwer, in the words of all the experienced, willow, ſallow, ozier, aſpen, alder, elder, poplar, birch; and if drained, oak, cheſnut, cherry, and elm.

Your 15th of cultivated ground, is, [p. 28.] What compoſts are beſt adapted to each ſoil?——Horſe-dung mixed with earth and lime in alternate layers and properly fermented, ſheep's-tath, dung of poultry mixed with coal-aſhes, marle, burnt earth or vegetables, are beſt for cold lands: For warm ſoils, cow-dung, horſe-dung, mud and clay mixt make an admirable compoſt.

The 22d, of cultivated lands, [p. 28.] Are more frequent plowings allowed than commonly practiſed; and what are their effects?——Some farmers two or three miles from me, have for ſome time paſt given their land, deſigned for barley, three tilths inſtead of two, which the unanimous practice of this country ſeemed formerly to have fixed as the proper number; and they are fully convinced that the laſt plowing is equal to a dunging. They give it the firſt immediately after harveſt, the ſecond in February and roll it, and the laſt in April, when they ſow and roll it again. After two furrows, they complained that the ſeed was either covered too irregularly, or, if they harrowed both before and after ſowing, that there was produced ſuch a luxuriant crop of weeds, as extremely to hurt the barley, both in its growth and winning. But they now find,

that

that it does (with the aſſiſtance of a ſteep made of ſalt, lime, and the juice of an old dunghill weakened with water) ſoon overpower every weed, and never fails of repaying their trouble moſt amply.

The 31ſt, of cattle, [p. 33.] demands, What neceſſity there is for ſmearing ſheep, and the beſt method of doing it? —— I never could learn any other uſe of it, than to kill the vermin, which hurt them exceedingly. The method my father followed, was, anointing them with a mixture of wormwood, broom, ſoap, hog's-lard, ſulphur and urine. He experienced this to be a preferable ſmear to tar and greeſe, as it made the wool grow plentiful and clear, and alſo is a preventative of the ſcab.

To the foregoing conciſe anſwers, I ſhall annex one or two calculations of a two hundred acre farm of loam, that from an impartial compariſon, the beſt of them, or a ſimilar courſe, may be choſen, by thoſe of my brother farmers, who have a ſoil adapted to it. The product I ſhall ſtate ſo low as is conſiſtent with the experience of all.

First Courſe. Fallow crops, Barley, Clover, Wheat.

20 acres of potatoes, at 30 bolls *per* acre, at 7 *s.* and 6 *d* *per* boll.	£. 225	0	0
* 10 ditto Carrots, at 100 bolls, at 15*s.*	75	0	0
* 10 ditto parſneps, at ditto, at ditto	75	0	0
10 ditto peaſe, at 4 grains free, at 13 *s.*	26	0	0
50 ditto barley, at 6 grains free, at 15 *s.*	225	0	0
50 ditto clover cut once, and then plowed down, at 100 ſtone *per* acre, at $4\frac{1}{2}$ *per* ſtone	93	15	0
50 ditto wheat, at 6 grains, at £. 1	300	0	0
Carried over,	£. 1019	15	0

* To feed hogs, &c.

				Brought over	£. 1019	15 0
If 30 acres of the clover be applied to keeping cows, 40 may be ſoiled well on it till autumn, when the ſtraw of the corns will keep them till ſpring. The cows milk may be eſtimated at ſix pints each a-day, for half a year, at one penny *per* pint, is,				£. 182	10	0
From which deduce,						
For 30 acres of clover	£. 56	5	0			
4 dairy maids at L. 6	24	0	0			
Other expences	10	0	0			
				90	5	0
					92	5 0
				Product	£. 1112	0 0

EXPENCES.

Rent	£. 200	0	0
5 men at L. 10 : 10 *s.* meat and wages	52	10	0
5 boys at L. 7 : 10 *s.*	37	10	0
2 men for extra work	21	0	0
16 horſes kept on ten acres clover in ſummer, and 10 in winter with two acres carrots and 16 bolls oats at 14 *s.* and ſome of the ſtraw	63	14	0
Keeping 20 cattle to aſſiſt in making the wheat ſeed	20	0	0
Reaping 110 acres victual at 3*s.* 6*d.*	19	5	0
Threſhing 640 bolls victual at 7*d. per* boll	18	13	4
Tear and wear	20	0	0
Clover ſeed	25	0	0
Intereſt of L. 500 ſtock at ſeven *per Cent.*	35	0	0
Expences on ſundry in marketing, &c.	19	15	0
Manure, as lime, &c	79	12	8
		£. 612	0 0
Profit		500	0 0

Second Courſe. Wheat, Peaſe or Beans, Oats, Turnips, Barley and Fallow.

33⅓ acres wheat, at 6 grains, is 200 bolls, at L. 1	£. 200	0	0
33⅓ ditto peaſe, at 4 grains free, at 12 *s.* 6 *d.*	83	6	8
33⅓ ditto oats, is 41 bolls ſowing, at 5, at 12 *s.*	123	0	0
33⅓ ditto turnip, at L. 3	100	0	0
33⅓ ditto barley, at 6, at 15 *s.*	150	0	0
33⅓ ditto fallow, at 6 *d. per* acre, ſheep's feed	00	16	8
Product	£. 657	3	4

EXPENCES.

Rent	£. 200	0	0
6 men and 5 boys	100	10	0
Keeping horſes and cattle	70	0	0
Reaping 133⅓ bolls victual at 3 *s.* 6 *d.*	23	6	8
Threſhing 738 bolls at 7 *d*	21	10	6
Tear and wear	20	0	0
Turnip ſeed	1	0	0
Intereſt of L. 400 ſtock at 7 *per Cent.*	28	0	0
Manure	42	16	2
	£. 507	3	4
Profit	£. 150	0	0

The third and laſt Courſe is according to the uniform practice of the farmers in this neighbourhood.

The infield may be ſuppoſed to conſiſt of thirty acres cropped with Bear, Oats, and Peaſe. The outfield cropt three years with Oats, and leaed ſix.

10 acres barley, at 5½, at 15 *s.*	£. 41	5	0
10 ditto oats, at 5, at 12 *s.*	30	0	0
10 ditto peas, at 4, at 12 *s.* 6 *d.*	25	0	0
56⅔ ditto oats on the outfield, at 4, at 12 *s.*	136	0	0
113⅓ ditto to keep 10 horſes, 20 oxen for work, 10 cows, 10 three year old ſtots, 10 two years old, 10 one year old, and 40 cattle for market, which will yield as follows:			
Carried over	£. 232	5	0

Brought over	£. 232	5	0
10 cows 16 weeks (the calves ſucking ten) at 5 pints each	23	6	8
10 oxen ſold every year (bred by the farmer as above	50	0	0
40 bought lean, and ſold one half fat at L. 1 : 5s. each	50	0	0
	£. 355	11	8

EXPENCES.

Rent	£. 200	0	0		
5 men and 5 boys	90	0	0		
Tear and wear	20	0	0		
Intereſt of L. 500 ſtock at *7 per Cent.*	35	0	0		
Expences of mercating	2	0	0		
				347	0 0
Profit				£. 8	11 8

If theſe calculations are juſt, or nearly ſo, How ought the advocates of the latter courſe to bluſh at their ſupine blindneſs to their own intereſt! I, from the bottom of my heart, entreat, I conjure them, as members of ſociety, as the friends of their families; by every tie divine or human, I beg they would bethink themſelves, and not ſuffer indolence, timidity and inattention, to overpower them ſo far, as to bereave them of that invaluable endowment Reaſon, which certainly was given them to diſtinguiſh betwixt Right and Wrong. What reaſon have we to think, that Agriculture has arrived at its *ne plus ultra*, any more than other branches of philoſophy. Other arts and ſciences have been much improved within theſe two laſt centuries, while this moſt uſeful one has been ſtrangely neglected. I cannot help thinking, that it is owing to their ignorance of the means of acting properly, rather than to prejudice or lazineſs, that they have continued plodding on in the tract of their anceſtors ſo long, without ſuffering a minute's thought on the propriety or impropriety of their conduct to intrude itſelf upon them. By ſuch a conduct we proclaim ourſelves mere machines, unworthy the poſſeſſion of rational faculties. I am,

Fife, September 20th, 1773.

Yours, &c.

PHILAGROS.

TABLES of the conſtitutional parts of an Acre, both in Scots and Engliſh meaſure.

Scots Meaſure.

	Roods.	*Falls.*	*Ells.*	*Feet.*
One acre	4	100	5760	54760
One rood	1	40	1440	13690
One fall	0	1	36	342. 25
One ell	0	0	1	9. 50694

Engliſh Meaſure.

	Roods.	*Poles.*	*Yards.*	*Feet.*
One acre	4	160	4840	43560
One rood	1	40	1210	10890
One pole	0	1	30. 25	272 25
One yard	0	0	1	9

Land is commonly meaſured in England by a chain of 22 yards, and in Scotland by a chain of 24 Scots ells; each of which chains are divided into 100 links; and the area of the field found in ſquares of the ſaid links. Now in Scotland, having the area in ſquare links, cut off five figures to the right hand, and note the reſt for acres, which ſet apart: Multiply the five figures cut off by 4, cutting off five figures of the product as above; ſet the remainder after the acres for roods: Multiply the laſt five figures by 40, ſtill cutting off five, and put the reſt after the roods for falls: Multiply this laſt five by 36, cutting off five, and ſet the reſt after the Falls for ells. Again, multiply the five yet remaining by 9.50694, cutting off five, and place the reſt after the ells for feet, the five laſt cut off being decimals of a foot.

In Engliſh meaſure, cut off the five right hand figures from the ſquare links as above, noting the reſt for acres; then multiply by 4 cutting off five figures for roods; again multiply by 40 cutting off five figures, the reſt are poles; then multiply by 30. 25, cutting off as above for yards; laſtly multiply by 9, for feet and decimals of a foot.

TABLE

TABLE for reducing the price of the Engliſh Quarter to the Price of the Scots Boll.

Price of the Quarter.			Barley or Oats per Boll.				Wheat or Peaſe per Boll.			
l.	*s.*	*d.*	*l.*	*s.*	*d.*	*f.*	*l.*	*s.*	*d.*	*f.*
0	12	0	0	8	11	0	0	6	1	1
0	12	6	0	9	3	2	0	6	4	2
0	13	0	0	9	8	0	0	6	7	2
0	13	6	0	10	0	1	0	6	10	2
0	14	0	0	10	4	3	0	7	1	2
0	14	6	0	10	9	1	0	7	4	3
0	15	0	0	11	1	3	0	7	7	3
0	15	6	0	11	6	1	0	7	10	3
0	16	0	0	11	10	3	0	8	1	3
0	16	6	0	12	3	0	0	8	4	3
0	17	0	0	12	7	2	0	8	8	0
0	17	6	0	13	0	0	0	8	11	0
0	18	0	0	13	4	2	0	9	2	0
0	18	6	0	13	9	0	0	9	5	0
0	19	0	0	14	1	2	0	9	8	0
0	19	6	0	14	5	3	0	9	11	1
1	0	0	0	14	10	1	0	10	2	1
1	0	6	0	15	2	3	0	10	5	1
1	1	0	0	15	7	1	0	10	8	1
1	1	6	0	15	11	3	0	10	11	2
1	2	0	0	16	4	1	0	11	2	2
1	2	6	0	16	8	2	0	11	5	2
1	3	0	0	17	1	0	0	11	8	2
1	3	6	0	17	5	2	0	11	11	3
1	4	0	0	17	10	0	0	12	2	3
1	4	6	0	18	2	2	0	12	5	3
1	5	0	0	18	6	3	0	12	8	3
1	5	6	0	18	11	2	0	12	11	3
1	6	0	0	19	3	3	0	13	3	0
1	6	6	0	19	8	2	0	13	6	0
1	7	0	1	00	1	0	0	13	9	0

In England, all Grain is bought and ſold by the Quarter: In Scotland by the Boll. The Scots Boll varies in its Meaſure according to the different Grains, the Boll of Barley and Oats being conſiderably larger than the Boll of Wheat or Peaſe.

A TABLE for reducing Engliſh buſhels or Quarters to Scots meaſure; according to the Edinburgh Standards.

Engliſh Meaſure	Scots Barley or Oats.				Scots Wheat or Peaſe.			
	Bolls.	Firlots.	Pecks	100 parts	Bolls.	Firlots.	Pecks.	100 parts
Buſh. 1	0	0	2	69	0	0	3	92
2	0	1	1	38	0	1	3	85
3	0	2	1	07	0	2	3	78
4	0	2	2	76	0	3	3	70
5	0	3	1	46	1	0	3	63
6	1	0	0	15	1	1	3	56
7	1	0	2	84	1	2	3	49
Quart. 1	1	1	1	53	1	3	3	41
2	2	2	3	07	3	3	2	83
3	4	0	0	61	5	3	2	25
4	5	1	2	14	7	3	1	67
5	6	2	3	68	9	3	1	09
6	8	0	1	22	11	3	0	51
7	9	1	2	76	13	2	3	93
8	10	3	0	29	15	2	3	35
9	12	0	1	83	17	2	2	77
10	13	1	3	37	19	2	2	19
20	26	3	2	74	39	1	0	38
30	40	1	2	11	58	3	2	57
40	53	3	1	49	78	2	0	76
50	67	1	0	86	98	0	2	95
60	80	3	0	23	117	3	1	14
70	94	0	3	60	137	1	3	33
80	107	2	2	98	157	0	1	52
90	121	0	2	35	176	2	3	71
100	134	2	1	72	196	1	1	90

Note, 4 Buſhels make 1 Comb
8 Buſhels or 2 Combs, 1 Quarter
4 Quarters, 1 Chalder, Engliſh meaſure.

And 4 Lippies make 1 Peck
4 Pecks, 1 Firlot
4 Firlots, 1 Boll
16 Bolls, 1 Chalder, Scots Meaſure.

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